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H.G.Bull, del. W.G.Smith, lith.

Hygrophorus Houghtoni. B & Br.

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DESCRIPTION OF PLATE.

HYGROPHORUS HOUGHTONI, B. & Br.

Pileus convex, the centre at length depressed; stem transversely undulated; *cuticle thick gelatinous, extremely viscid;* gills decurrent, thin, yellowish pink; pileus 1½—2 inches broad, pink; stem 2—4 inches long, and at its juncture with the pileus generally tinged with blue. Odour, at first none, but, after being shut up in a box for a time, decidedly foxy. The gelatinous coat of the pileus is very thick and at length separates and forms a cup in the centre.

Habitat, in mossy places in woods: Ercal Heath woods in Shropshire where it was first found by the Rev. Wm. Houghton, M.A., F.L.S.: Dinedor Hill meadows, Herefordshire, by Dr. Bull: On the Blorenge, Abergavenny, and at Mayfield, Sussex, by Mr. Renny. See "*Annals of Natural History.*" May, 1873—1360.

Fries in his New Edition of the "Epicrisis," says of this species "maxime singularis, cujus affinitas mihi ignota"—p. 416. No. 44.

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OF THE

WOOLHOPE

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(ESTABLISHED MDCCCLI.)

1871-2-3.

"HOPE ON—HOPE EVER."

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1873.

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RULES

OF THE

WOOLHOPE NATURALISTS' FIELD CLUB.

I.—That a Society be formed under the name of the "WOOLHOPE NATURALISTS' FIELD CLUB," for the practical study, in all its branches, of the Natural History of Herefordshire and the districts immediately adjacent.

II.—That the Club consist of Ordinary Members, with such Honorary Members as may be admitted from time to time; from whom a President, four Vice-Presidents, a Central Committee, Treasurer, and Honorary Secretary be appointed at an Autumn Meeting for the following year, though they shall not take office until after the Annual Meeting to be held at Hereford in the early part of each year. The President and Vice-Presidents to change annually.

III.—The Central Committee shall consist of three members, resident in the city or in its immediate vicinity, with the President, Vice-Presidents, and Honorary Secretary *ex-officio*. It shall be empowered to appoint an Assistant Secretary; and its duties shall be to make all the necessary arrangements for the meetings of the year. and take the management of the Club during the intervals of the meetings.

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IV.—That the Members of the Club shall hold not less than three Field Meetings during the year, in the most interesting localities for investigating the natural history of the district. That the days and places of such regular meetings be selected at the Annual Meeting, and that ten clear days' notice of each be communicated to the Members by a circular from the Secretary; but that the Central Committee be empowered, upon urgent occasions, to alter the days of such regular Field Meetings, and also to fix special or extra Field Meetings during the year.

V.—That an Entrance Fee of Ten Shillings shall be paid by all Members on election, and that the Annual Subscription be Ten Shillings, payable on the 1st of January in each year, to the Treasurer, or Assistant Secretary. Each Member may have the privilege of introducing a friend on any of the field days of the Club.

VI.—That the Reports of the several meetings, and all the papers read to the Club during the year, be forwarded to the *Hereford Times* newspaper for publication as ordinary news, and that the type be re-set in octavo at the expense of the Club, to form (with such additions as may be deemed advisable) the Transactions of the Club.

VII.—That the cost of any lithographic or other illustrations be defrayed by the author of the paper for which they may be required, unless the subject has been taken up at the request of the Club, and in that case, the cost of such illustration to be paid for from the Club funds, must be specially sanctioned at one of the general meetings.

VIII.—That the President of the year arrange for an address to be given in the field at each meeting, and for papers to be read after dinner; and that he be requested to favour the Club with an address at the Annual Meeting, on the proceedings of the year, together with such observations as he may deem conducive to the welfare of the Club and the promotion of its objects.

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IX.—That all candidates for Membership shall be proposed and seconded by existing Members, either verbally or in writing, at any meeting of the Club, and shall be eligible to be ballotted for at the next meeting, provided there be FIVE Members present; one black ball in THREE to exclude,

X.—That Members finding rare or interesting specimens, or observing any remarkable phenomenon relating to any branch of Natural History, shall immediately forward a statement thereof to the Hon. Secretary, or to any member of the Central Committee.

XI.—That the Club undertake the formation and publication of correct lists of the various natural productions of the County of Hereford, with such observations as their respective authors may deem necessary.

XII.—That Members whose subscriptions shall remain for *three* years in arrear after demand, be held to have withdrawn, and their names shall accordingly be omitted from the list of Members at the ensuing Annual Meeting.

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XIV.—That these Rules be printed annually with the Transctions, for general distribution to the Members.

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THE REMARKABLE TREES
OF
HEREFORDSHIRE.

ST. CATHERINE'S OAK.

(Quercus robur) May, 1873.

This very fine well balanced tree grows at Homend, near Ledbury, upon the estate of The Rev. Wm. Poole. At 5ft. from the ground where the card of the Club is placed (itself 1ft. long, by 6in. deep) the tree measures 20ft. 7in, in circumference. At 50 feet the bole divides into the main branches of the tree, and the extreme height they attain is 115ft. The spread of foliage is 105 feet. The oval patch in the picture represents a zinc plate which marks the loss of a branch on the south side, the chief misfortune of the tree's life. The condition of the tree, at this time, is best shewn, perhaps, by the fact that a Timber Dealer offered £150 for it last year (1872).

At some little distance from the tree there is a fine spring of water in the park. Tradition supposes it to have issued miraculously on the spot where the good St. Catherine, of Ledbury, rested in one of her pilgrimages. Its waters are in high repute amongst the villagers, far and wide, for their medicinal virtues, especially for sore eyes. How should it be otherwise, since its traditions are aided by these mysterious characters engraved on the stone above it :

"Αριστον μεν υδωρ."

This Photograph is kindly presented to the Club by Mr. Poole

Ladmore and Son, Photographers to the Woolhope Naturalists' Field Club.

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OFFICERS FOR THE YEAR

1871.

President:

THOMAS CAM, ESQ., Hereford.

Vice-Presidents:

E. J. ISBELL, ESQ., Hereford.
EVAN PATESHALL, ESQ., Allensmore Court, Hereford.
The REV. THOMAS PHILLIPPS, M.A., Dewsall Vicarage, Hereford.
The REV. H. W. PHILLOTT, M.A., Staunton-on-Wye, Hereford.

Central Committee of Management:

T. CURLEY, ESQ., C.E., F.G.S., Hereford.
JOHN LLOYD, ESQ., Huntington Court, Hereford.
C. G. MARTIN, ESQ., Hereford.

Honorary Secretary:

The REV. SIR G. H. CORNEWALL, BART., Moccas Court, Hereford.

Treasurer and Assistant Secretary:

MR. ARTHUR THOMPSON, St. Nicholas Street, Hereford.

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The Woolhope Naturalists' Field Club.

LIST OF HONORARY MEMBERS.

*N.B. Those Members to whose names the asterisk * is prefixed have contributed papers to the Club.*

Year of Election.		
1854		Sir William Jardine, Bart., F.R.S., &c., &c., Jardine Hall, Dumfriesshire.
1855		Sir Charles Lyell, Bart., M.A., F.R.S., &c., London.
1851		Sir Roderick I. Murchison, Bart., F.R.S., &c., 16, Belgrave-square, London.
1851		George Bentham, Esq., President of the Linnean Society, &c., London.
1855	*	G. Phillips Bevan, Esq., F.G.S., 4, Suffolk-square, Cheltenham.
1851	*	Rev. P. B. Brodie, M.A., F.G.S., Rowington Vicarage, Warwick.
1869	*	Flavell Edmunds, Esq., F.R.H.S., Hereford.
1853		William H. Fitton, Esq., M.D., F.R.S., F.G.S., &c.
1860		Dr. H. B. Geitnitz, Professor of Geology, &c., Dresden.
1861	*	Edwin Lees, Esq., F.L.S., F.G.S., President of the Malvern Field Club.
1851	*	R. M. Lingwood, Esq., F.G.S., &c., Cheltenham.
1859	*	Professor W. Melville, Queen's College, Galway, Ireland.
1851		Professor John Phillips, F.R.S., F.G.S., Oxford.
1851	*	Rev. W. H. Purchas, Alstonfield, near Ashbourne, Derbyshire.
1853		Rev. Professor A. Sedgwick, B.D., F.R.S., &c., University, Cambridge.
1869	*	Worthington G. Smith, Esq., F.L.S., 12, North Grove West., Mildmay-park, London.
1854	*	Sir W. V. Guise, Bart., F.G.S., &c., Elmore Court, Gloucester, President of the Cotteswold Naturalists' Field Club.
1865		W. H. Paine, Esq., Stroud, Honorary Secretary of the Cotteswold Naturalists' Field Club.
1851	*	Rev. W. S. Symonds, F.G.S., Pendock Rectory, Tewkesbury.
1851		Rev. R. P. Hill, Broomsberrow, Ledbury, Hon. Secretary of the Malvern Field Club.
1869	*	Mr. With, Hereford.
		The President of the Warwickshire Naturalists' Field Club.
		The President and Hon. Secretary of the Oswestry and Welshpool Naturalists' Field Club.
		The President, Curator, and Hon. Secretary of the Dudley and Midland Geological and Scientific Society and Field Club.
		The President and Hon. Secretary of the Severn Valley Field Club.
		The President and Hon. Secretary of the Caradoc Field Club, Salop.
		The President and Hon. Secretary of the Worcestershire Naturalists' Club.

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ORDINARY MEMBERS.

1871.

N.B. Those Members to whose names the asterisk is prefixed have contributed papers to the Club.*

Year of Election.		
1868		Adams, Mr. Thomas, New House, Marden, Hereford.
1859	*	Adams, William, Esq., Cardiff.
1867		Allen, B. Haigh, Esq., The Priory, Clifford, Hay, R.S.O.
1870		Alexander, Joseph G., Esq., 3, New-square, Lincoln's-inn, London, W.C.
1867		Andrew, Mr. John (deceased), Catley-cross, Bosbury, Ledbury.
1867		Arkwright, John H., Esq., Hampton Court, Leominster.
1864	*	Armitage, Arthur, Esq., Dadnor, Ross.
1868		Aston, William, Esq. (deceased), Baramore House, Withington, Hereford.
1870		Bamford, Rev. Robert, M.A., Little Dewchurch, Ross.
1855	*	Banks, R. W., Esq., Ridgebourne, Kington.
1870		Bateman, the Right Hon. Lord, Shobdon Court, Leominster.
1867		Beavan, Rev. T. M., B.A., King's Thorn, Much Birch, Ross.
1853	*	Blashill, Thomas, Esq., 10, Old Jewy Chambers, London, E.C.
1870	*	Blight, Rev. R., B.A., Bredwardine, Hereford.
1866		Bodenham, C. De la Barre, Esq., Rotherwas, Hereford.
1867		Bodenham, Frederick, Esq., Thornton, Hereford.
1868		Bowen, J. Mortimer, Esq., Chancefield, Talgarth.
1868		Bowen, Rev. William, Alvecote, Tamworth.
1870		Bridgewater, Colonel, Coity Mawr, Brecon.
1867		Broughton, F., Esq., Brecon.
1851	*	Bull, H. G., Esq., M.D., St. John's-street, Hereford.
1869		Bulmer, John, Esq., Uplands, Hereford.
1851	*	Cam, Thomas, Esq., 13, St. Owen's-street, Hereford.
1869		Capel, Rev. Bury, Abergavenny.
1867		Capper, Rev. D. P., Lystone House, Ross.
1867		Capper, R. Harcourt, Esq, Northgate, Ross.
1869		Carless, Joseph, jun., Esq., Offa-street, Hereford.
1869	*	Chapman, T. Algernon, Esq., M.D., Burghill, Hereford.
1866		Clark, Rev. Samuel, M.A., Eaton Bishop, Hereford.
1870		Clay, Rev. G. H. M.A., Kington.
1868		Clive, Rev. Archer, Whitfield, Hereford.
1869		Clive, George, Esq., Perrystone, Ross.
1856	*	Cocking, George, Esq., Ludlow.
1866		Collins, John Stratford, Esq., Wythall, Ross.
1855		Colvin, Colonel C. B. (deceased), Leintwardine, Herefordshire.
1868		Cooke, W. H., Esq., Q.C., 42, Wimpole-street, Cavendish-square, London, W.
1863		Cornewall, Rev. Sir G. H., Bart., Moccas Court, Hereford.
1851	*	Crouch, Rev. J. F., B.D., Pembridge Rectory, Herefordshire.
1855	*	Curley, Timothy, Esq., C.E., F.G.S., Broomy-hill, Hereford.
1865		Davis, Isaac, Esq., The Bulwark, Brecon.

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Year of Election.		
1867	*	Davies, James, Esq., Wood View, Hereford.
1866		Davies, Rev. James, M.A., Moorcourt, Pembridge, Herefordshire.
1870		Davies, James Henry, Esq., do., do., do.
1860	*	Dixon, Rev. Robert, M.A., High School, Nottingham.
1867		Downing, Mr. J. B., Holme Lacy, Hereford.
1864		Du Buisson, Rev. E., M.A., Brienton Court, Hereford.
1865		Eld, Rev. F. J., M.A., 30, Britannia-square, Worcester.
1870		Evans, Rev. E. A., B.A., Holmer Vicarage, Hereford.
1867		Evans, E. Middleton, Esq., Llwynbarried, Nantmel, Rhayader.
1869		Evans, Rev. John, M.A., Pengrove, Aylestone-hill, Hereford.
1863		Feilden, Lieutenant-Colonel, Dewlas Court, Hereford.
1851		Fowle, Rev. W. C., Brinsop Vicarage, Hereford.
1867		Fowler, J. T. Owen, Esq., St. John's-street, Hereford.
1864		Garrold, T. W., Esq., Broomy-hill, Hereford.
1868		George, Rev. D. J., B.A., Trelough, Hereford.
1870		George, Frederick, Esq., M.D., Much Birch, Ross.
1861	*	Gray, Rev. Arthur, M.A., Orcop, Ross.
1869		Hall, Mr. H. S., Hill Court, Castle Froome, Bromyard.
1870	*	Harman, Mr. F. E., The Valletts, Hereford.
1863		Harrison, D. R., Esq., Holmer Hall, Hereford.
1870	*	Havergal, Rev. F. T., M.A., Pipe and Lyde Vicarage, Hereford.
1868	*	Herbert, J. M., Esq., Rocklands, Ross.
1863		Hereford, Richard, Esq., Sufton Court, Hereford.
1867		Hereford, Captain, Sufton Court, Hereford.
1864		Hereford, Rev. R., M.A., Sutton, Hereford.
1866		Hernaman, Rev. J. W. D., M.A., Ranelegh House, Malvern Link.
1854		Hill, Rev. H. T., M.A., Felton Rectory, Bromyard.
1861	*	Hoskyns, C. Wren, Esq., M.P., Harewood, Ross.
1867		Husbands, E. T., Esq., Dineterwood, Pontrilas, Hereford.
1868		Hutchinson, Arthur, Esq., Hagley Park, Hereford.
1868		Hutchinson, E. S., Esq., Longworth, Hereford.
1864	*	Isbell, E. J., Esq., Richmond-place, Hereford.
1860		Jenkins, H. J., Esq., Copelands, Hereford.
1869		Jenkins, Rev. John Rees, Cwmbran Parsonage, Newport, Mon.
1868		Jones, Rev. A. G., B.A., The Castle, Yarkhill, Hereford.
1866		Jones Machen, Rev. J. Edward, Llanthewy Parsonage, Caerleon, Monmouthshire.
1865		Jones Thomas, Rev. William, M.A., Llanthomas, Hay, Breconshire.
1864		Jukes, Rev. J. H., M.A., 29, Commercial-road, Hereford.
1868		Kempson, F. R., Esq., 34, Castle-street, Hereford.
1863	*	Key, Rev. H. Cooper, M.A., F.R.A.S., Stretton Rectory, Hereford.
1870		Knight, J. H., Esq., Vaga House, Hereford.
1868		Lambe, John, Esq., 35, Bridge-street, Hereford.
1869		Lawrence, David, Esq., The Priory, Usk, Mon.
1864	*	Lee, John Edward, Esq., F.G.S., &c., Villa Syracusa, Torquay.
1855	*	Lightbody, R., Esq., F.G.S., Castle-street, Ludlow.
1867		Llanwarne, Thomas, Esq., 24, St. Martin's-street, Hereford.
1867	*	Lloyd, John, Esq., Huntington Court, Hereford.
1870		Marshall, Rev. H. B., M.A., Blakemere, Hereford.
1864	*	Martin, C. G., Esq., 9, High-street, Hereford.
1869		Matthews, B., Esq., Broad-street, Ludlow.
1861	*	McCullough, D. M., Esq., M.D., Larchfield, Abergavenny.
1853	*	Merewether, Rev. F., B.C.L., Woolhope Vicarage, Ledbury.
1868		Merriman, J. Jones, Esq., 45, The Square, Kensington, London, W.
1864		Morris, J. G., Esq., 135, St. Owen's-street, Hereford.
1864		Newton, Marcellus, Esq., 2, The Cedars, Hampton Park, Hereford.
1867		Owen, Evan, Esq., Builth, Breconshire, R.S.O.
1867		Owen, Rev. E. J., B.A., Tretire Rectory, Ross.
1867		Palin, Rev. Edward, B.D., Linton Vicarage, Ross.
1866		Pateshall, Evan, Esq., Allensmoor Court, Hereford.

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Year of Election.		
1869		Phillipps, Rev. Alfred, Abbey Dore Rectory, Hereford.
1867	*	Phillipps, Rev. Thomas, M.A., Dewsall Vicarage, Hereford.
1861		Phillips, Mr. William, 21, High Town, Hereford.
1863		Phillott, Rev. H. W., M.A., Staunton-on-Wye, Hereford.
1867		Pitt, Mr. John H., Freetown, Ledbury.
1863		Poole, Rev. William, M.A., Hentland, Ross.
1870		Power, K. M., Esq., Hill Court, Ross.
1869		Price, Mr. William, The Vern, Bodenham, Leominster.
1856	*	Purchas, Alfred, Esq., Broad-street, Ross.
1866	*	Rankin, James, Esq., Bryngwyn, Hereford.
1866		Reaveley, Rev. F. Fenwick, S.C.L., Kinnersley Rectory, Letton, Hereford.
1868		Robinson, Rev. C. J., M.A., Norton Canon Vicarage, Weobley.
1868		Rosher, Lilburn, Esq., Trewyn, Abergavenny.
1868		Salwey, Alfred, Esq., Moor Park, Ludlow.
1854	*	Salwey, Humphrey, Esq., The Cliffe, Ludlow.
1864		Scudamore, Colonel, Kentchurch Court, Hereford.
1867		Shellard, Orlando, Esq., Barton Manor House, Hereford.
1859	*	Smith, J. E., Esq., Hay, Breconshire, R.S.O.
1868		Smith, Rev. I. Gregory, M.A., Tedstone Delamere, Upper Sapey, Worcester.
1868		Smith, R. Vassar, Esq., Wootton Hill House, Gloucester.
1870		Smith, Rev. T. Twistlethwaite, Thruxton Rectory, Hereford.
1866	*	Southall, Mr. H., Ashfield, Ross.
1863		Stanhope, Rev. B. L. S., M.A., Byford Rectory, Hereford.
1867		Stanhope, Rev. William P. S., M.A., Holme Lacy, Hereford.
1854	*	Steele, Elmes Y., Esq., Frogmore-street, Abergavenny.
1867		Stillingfleet, Rev. H. J. W., M.A., Hampton Bishop Rectory, Hereford.
1870	*	Swinburne, William A., Esq., Dûlas, Hay, R.S.O.
1869		Symonds, Lieutenant-Colonel, Pengethley, Ross.
1869		Taylor, William, Esq., M.D., 19, High-street, Cardiff.
1870		Thomas, John E., Esq., Hay, R.S.O.
1851	*	Thompson, Mr. Arthur, 12, St. Nicholas-street, Hereford.
1869		Truscott, Charles, Esq., jun., Trevarrick, St. Austell, Cornwall.
1868		Turner, Thomas, Esq., 141, St. Owen's-street, Hereford.
1866		Tweed, Rev. H. W., M.A., Bridstow Vicarage, Ross.
1866		Vaughan, James, Esq., Builth, Breconshire, R.S.O.
1870		Walkey, Rev. C. C., M.A., Lucton, Leominster.
1862	*	Weare, Rev. T. W., M.A. (deceased), Hampton Bishop, Hereford.
1859		West, Rev. Thomas, M.A., Fownhope Vicarage, Hereford.
1869		West, W. H., Esq., Gliffaes, Brecon.
1866		Westropp, Rev. C. J., B.A., Wormbridge, Hereford.
1866		Williams, Captain, Talgarth, Breconshire, R.S.O.
1869		Williams, Rev. R. H., B.A., Byford, Hereford.
1870		Wood, H. H., Esq., White House, Vowchurch, Hereford.
1867		Wood, J. H., Esq., Tarrington, Ledbury.
1861	*	Woodhouse, Rev. Thomas, M.A., Ropley, Alresford, Hants.
1869		Wynne, N. S., Esq., Broad-street, Hereford.

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NEW MEMBERS ELECTED DURING THE YEAR 1871.

Apperley, H. G., Esq., 6, St. John-street, Hereford.
Davies, Mr. Hugh Powell, Moor Court, Pembridge.
Gibson, William Charles, Esq., Sugwas Court, Hereford.
Grasett, Rev. James E., Allensmore Rectory, Hereford.
Herbert, F. W., Esq., Credenhill Park, Hereford.
Hodgson, J. Grant, Esq., Cabalva, Hay, Breconshire, R.S.O.
Jones, Dr. Talfourd, Infirmary, Brecon.
Lighton, Rev. Sir Christopher, Bart., Ellastone Vicarage, Ashbourne, Derbyshire.
Pilkington, Rev. C. H., Letton, Hereford.
Thackwell, Rev. Stephen, Little Birch Rectory, Hereford.

SUMMARY TO THE END OF 1871.

Ordinary Members	155
Honorary Ditto	27
Total	182

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RULES

OF THE

WOOLHOPE NATURALISTS' FIELD CLUB.

I.—That a Society be formed under the name of the "WOOLHOPE NATURALISTS' FIELD CLUB," for the practical study, in all its branches, of the Natural History of Herefordshire and the districts immediately adjacent.

II.—That the Club consist of Ordinary Members, with such Honorary Members as may be admitted from time to time; from whom a President, four Vice-Presidents, a Central Committee, Treasurer, and Honorary Secretary be appointed at an Autumn Meeting for the following year, though they shall not take office until after the Annual Meeting to be held at Hereford in the early part of each year. The President and Vice-Presidents to change annually.

III.—The Central Committee shall consist of three members, resident in the city or in its immediate vicinity, with the President Vice-Presidents, and Honorary Secretary *ex-officio*. It shall be empowered to appoint an Assistant Secretary; and its duties shall be to make all the necessary arrangements for the meetings of the year, and take the management of the Club during the intervals of the meetings.

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IV.—That the members of the Club shall hold not less than three Field Meetings during the year, in the most interesting localities for investigating the Natural History of the district. That the days and places of such regular meetings be selected at the Annual Meeting, and that ten clear days' notice of each be communicated to the Members by a circular from the Secretary; but that the Central Committee be empowered, upon urgent occasions, to alter the days of such regular Field Meetings, and also to fix special or extra Field Meetings during the year.

V.—That an Entrance Fee of Ten Shillings shall be paid by all Members on election, and that the Annual Subscription be Ten Shillings, payable on the 1st of January in each year, to the Treasurer, or Assistant Secretary. Each Member may have the privilege of introducing a friend on any of the field days of the Club.

VI.—That the Reports of the several meetings, and all the papers read to the Club during the year, be forwarded to the *Hereford Times* newspaper for publication as ordinary news, and that the type be re-set in octavo at the expense of the Club, to form (with such additions as may be deemed advisable) the Transactions of the Club.

VII.—That the cost of any lithographic or other illustrations be defrayed by the author of the paper for which they may be required, unless the subject has been taken up at the request of the Club, and in that case the cost of such illustrations to be paid for from the Club funds, must be specially sanctioned at one of the general meetings.

VIII.—That the President of the year arrange for an Address to be given in the field at each meeting, and for papers to be read after dinner; and that he be requested to favour the Club with an address at the Annual Meeting, on the proceedings of the year, together with such observations as he may deem conducive to the welfare of the Club and the promotion of its objects.

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XIII.—That the Assistant Secretary do send out circulars ten days at least before the Annual Meeting, to all Members who have not paid their subscription, and draw the particular attention of all those that may be affected by the operation of Rule XII, to that Rule.

XIV.—That these Rules be printed annually with the Transactions, for general distribution to the Members.

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THE LAUGH-LADY OAK.

(Quercus pedunculata.)

This grand old tree grows on the hill-side of the Laugh-Lady Dingle in Brampton Brian Park. At some far distant period its top has been broken off, and its bole driven asunder; very possibly by the violent tempest of Sept. 3rd, 1645, at the time of Cromwell's death, which is known to have been very destructive in this park (See *Woolhope Transactions for* 1870, pp. 302). It now presents a hollow stem divided into three sections, and each one has so far recovered itself as to send up numerous branches of a considerable size, and be everywhere luxuriant. At five feet from the ground, it gives the large circumference of thirty feet, but the measurement cannot be considered true since the rents reach the ground on two sides and one of them gapes widely.

The excellent sketch on the opposite page shows admirably its present condition. It has been kindly made and presented to the Club by Lady Frances Harcourt.

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THE

ADDRESS OF THE RETIRING PRESIDENT,

(THOMAS CAM, ESQ.,)

Read at the Annual Meeting of the Woolhope Naturalists' Field Club, held at Hereford, March 1st, 1872.

GENTLEMEN,—Before I finally leave the presidential chair, I will, by your permission, follow the custom of my predecessors, and in a parting address give you a short account of our proceedings at the several Field meetings of the past year.

Our first meeting was held on Friday, 25th of May, at Hay, when we were honoured by the presence of Messrs. Lees, Symonds, Hill, and other veterans of the Malvern Club, who had accepted our invitation to join us on the occasion.

After the ordinary business of our respective Clubs had been transacted, we started on a visit to Twyn-y-beddau, a Tumulus situated near the New Forest farm, at the foot of the Black Mountain, the contents of which the lord of the manor, Viscount Hereford, had kindly given us permission to examine.

This ancient place of sepulture proved to be an example of the class of tumuli which Camden says was probably raised by the early inhabitants of this country a thousand years before either the Roman or Saxon invader ever arrived on the spot. The same antiquarian describes the manner of burial, which was thus performed. The dead body was laid upon the bare sward, plastered over with clay, and covered with dry turf; a fire was made over it with furze-wood until the corpse was reduced to ashes or the flesh consumed, then the charcoal and ashes were covered with earth, and sometimes stones were laid upon the heap.

The funeral contents of Twyn-y-beddau were found as usual at the bottom of the mound, and on a level with the surrounding ground; they consisted of a quantity of charcoal, burned bones, a few flint flakes, and a whetstone.

The Rev. W. Symonds having been called upon to address the meeting on the contents of the tumulus said: The pieces of flint were possibly used in the ancient

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thrashing machine, called a "*tribulum*," or might have been buried with the dead as an emblem of some kind; he added that specimens of the *tribulum* exist in some of the museums of this country, and are formed of a flat board, on the under surface of which sharp pieces of flint are inserted. It is worthy of mention that the same kind of implement is still used for similar purposes by the inhabitants who occupy the country of ancient Babylon and Nineveh. It is described by Layard, who saw them in use, as "a sledge stuck full of sharp flints on the under surface, and driven by oxen over the scattered sheaves; such also were the threshing-sledges, armed with teeth mentioned by the prophet Isaiah;" and from this implement, it has been suggested that the word tribulation is derived.

The other suggestion of Mr. Symonds is also worthy of notice, as it is known that pieces of agate and onyx and other silicious stones are often found in the tombs of the early Egyptians and ancient inhabitants of Italy; sometimes they are met with mounted in gold, and are supposed to have been worn round the neck as an amulet during the life-time of the deceased, and afterwards with a similar object interred with his remains.

The Rev. T. W. Webb, of Hardwick, who, at our request, had met us on the ground, exhibited some masses of flint, flint flakes, and pieces of iron, which had been picked up from time to time in the neighbourhood. It was the opinion of that gentlemen that more than one battle had taken place on the adjoining plain; the later one had been fought in the time of Edward III., and that the mound was the site of two separate interments. But whether such was the case or not, I think it was evident to most of us who stood by, that the remains we had met with at the bottom of the tumulus had been religiously respected, and that the place of their burial had not been systematically explored as those of the more civilised nations of the same age have been and still are, whenever they are met with, for the sake of the valuable objects they may be supposed to contain.

It is well known that it was the custom of the early Egyptians, Greeks, and Romans to bury with their departed relatives and friends some highly prized work of art or personal ornament, to which circumstance we owe the existence in the museums and private collections at home and abroad of many beautiful and costly examples of early art, among which I may mention the Portland vase in the British Museum and the celebrated Farnese tazza in the National Museum at Naples.

After leaving Twyn-y-beddau, we started on our return to Hay by the Cusop dingle. At Craigran waterfall, Mr. J. G. Thomas, of Hay, read a paper "On some of the geological features of the counties of Hereford, Brecon, and Radnor," in which he described how the beautiful hill and dale scenery of these counties was owing, on the one hand, to the disturbing forces on the earth's crust, whereby a large extent of country was suddenly raised or depressed, and on the other to the more gradual denuding effects of glaciers and running water.

At Cusop churchyard, the Rev. A. Pope, the curate, gave us an interesting account of the ancient and restored parish church while we rested under the grateful shade of one of its venerable yew trees, a photograph of which appeared in the Volume of our Transactions for 1866.

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Soon after leaving this sacred spot we again halted in front of the pretty residence of A. Swinburne, Esq., where that gentleman read an able paper on "The application of science to the improvement of manufactures," in which he described in popular terms the old and new methods of making glass, and the great improvements science had of late years effected in the manufacture of that material. His subject was illustrated by beautiful specimens of modern glass.

We shortly afterwards reassembled at Hay, where we partook of a dinner, which did credit to the catering of our host of the "Rose and Crown," and then a paper by A. Cheese, Esq., of Hay, was read, entitled "Historical notices of the district," which described the rise and fall of the Cwmry tribes in this country.

At the close of the meeting a paper by J. G. Smith, Esq., of Hay, on "The Cusop dingle as a valley of denudation," was, owing to the lateness of the hour, "taken as read." The tyro in geology sometimes feels a difficulty in determining which appearances in the present configuration of the earth's surface are due to upheavals, and which to the effects of atmospheric forces. In Mr. Smith's opinion, the formation of Cusop valley is clearly due to the latter causes; and the continued deepening of the dingle at the bottom of it is effected by the Dulas stream—that feeble representative of the ancient mountain torrent of the district—which still plays its part in lowering the bed of its rocky channel.

The botanical specimens of interest met with during the day were the Bear-garlic, *Allium ursinum*, the yellow violet, *Viola lutea*, the globe flower, *Trollius Europeus*, the water avens, *Geum rivale*, and the mountain fern, *Lastrea oreopteris*.

Our next meeting took place on the 27th of June, at Aberedw; it was the Ladies' meeting, and many of our fair friends left "their silken thread and flowery tapestry," resolved "to forget the world, its cares, and guilt, and passions, and live the day in sunshine and in beauty." We left Hereford at the Brecon station, and took the line to Aberedw, where we were met by Robert Baskerville Mynors, Esq., and the Rev. Henry Dew, who kindly undertook to be our leaders for the day.

First, we visited Aberedw churchyard, and examined the grand old yew trees, the largest of which measured 25 feet in girth, and so rather exceeds that of the great tree in Cusop churchyard. I believe the largest yew tree in this county is at Peterchurch, which measures 28 feet in circumference, but it is partially hollow and much weather beaten; while that at Aberedw is, to all appearance, a sound and sturdy tree and may live another thousand years, when we hope some active member of the Woolhope Club will again record its measurement.

Many of you are probably aware that the yew is not considered by Bentham and some other botanists to be a native of this country; Camden, however, has described it as such, and has placed it in the list of trees he considered indigenous to the mountains of Herefordshire. Those fine specimens of the tree which stand at the four angles of the church at Cusop, Leinthall, and Aberedw, are looked upon by many members of our Club as examples of where the yew has been brought

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to the church; but possibly there are some illustrations in this county of where the church has been brought to the yew, for we know with what satisfaction the early Christians as soon as they had the opportunity planted their churches in ground consecrated to Pagan worship, and they not only selected the sacred groves of the heathen for the purpose, but also their temples, proofs of which exist at the Acropolis, the Theseus, at Athens, and the great temple of Baal at Balbec, &c.

I believe the yew is much more frequently met with in South Wales than it is in North Wales, and some have attributed that circumstance to the fact of the bow having been the weapon of warfare peculiar to the inhabitants of South Wales, while that of the men of North Wales was the spear. But though the yew was serviceable for military purposes previous to the introduction of gunpowder, it is not very probable that the bowyer had recourse to the churchyard yew for his materials. Its branches were doubtless reserved for holier uses; for instance, we know they were employed in the decoration of churches as they are now, and it was the custom at funeral processions for the mourners to hold them over the bier and afterwards to throw them on the coffin when in the grave; and again, the expense of consecrated yew for conversion into bows would have been a great obstacle to its use for such purposes. Its cost at the time I refer to is showed by the ancient laws of Wales, in which a consecrated yew is valued at a pound, while an unconsecrated one only figures in the tariff at 30 pence, and was held at less value than the mistletoe branch, which is set down at threescore pence. For further interesting points relating to the yew I must refer you to Mr. Woodhouse's paper on the subject, and the discussion that followed, both of which you will find in our transactions for 1866.

After we had left the churchyard we crossed the Edw and proceeded over the wooded hill to the Cave of Llewellyn, the hiding place of the last Prince of Wales, who is said to have taken refuge there when pressed by Mortimer and his followers. Though some have questioned this statement, there is no doubt that the cave is situated in historic ground, for the neighbourhood was the favourite hunting place of that Prince, and some of the last scenes of his life were enacted within a short distance of the spot. It is stated that after he left the cave he entrusted his safety to a smith, who had his forge on the left bank of the Wye, by whom his horse's shoes were reversed in order to mislead his pursuers, and by whom he was afterwards betrayed. But the Prince was destined to meet with greater traitors among his retainers at Builth, who refused him assistance, and later in the day he was overtaken by his enemies, and fell by a spear wound near a spot which is called Cwm-Llewellyn, the Cave of Llewellyn, to this day.

Soon after we had left this romantic spot we continued our walk over the Llanbedarn hills, and so reached the Aberedw rocks.

These rocks are of the Upper Ludlow formation, and form the left boundary of the Edw, and after they leave their garrulous companion run for about two miles towards Erwood. I must refer you to the sixth number of our transactions for a list of their fossils by Messrs. Griffiths and Powell.

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On a rocky eminence, situated high up on the right bank of the Edw, called the "Mount," we held our pic-nic. Afterwards J. Rankin, Esq., read his "Notes on Insectivora," in which he described a class of insect feeding little animals nearly allied to the bats, and chiefly represented in this country by the mole, the shrew mouse, and hedgehog. These interesting little creatures are seldom seen to cross our path, but are often met with there cold and stiff as the ground beneath them, destroyed either by the wanton hand of man or worried in sport by some straying dog or cat, by whom they are seldom or never eaten, as the shrew-mouse in particular possesses a most obnoxious smell, which causes it to be rejected as food by all animals. But I may remark that this objection does not hold good with respect to the hedgehog, for in some of the cookery books of the last century it is included in the list of removes for the month of December. It is said that the epicurean gipsy is well aware of the delicacy of this animal, and that he recommends it to be rolled in clay and baked on the fire till the ball shall have become brittle, when on breaking it, the spines of the animal will be found adhering to the clay, and the flesh within left clean and well cooked.

Mr. Rankin proceeded to remark that all the animals of the order have numerous conical teeth, that they differ in number in the two jaws, and very much resemble those of the bat, especially in the gap which is frequently found between the front teeth and the incisors. He illustrated this part of his subject by prepared specimens of the cranium and lower jaw, and next drew our attention to the formation of some of the other organs of the shrew and the mole, and their peculiar habits, especially those of the mole.

Little discussion followed the reading of this paper; but one gentleman who stood by asked Mr. Rankin what became of the moles in flood time, as he was not satisfied with the answer he had received from a countryman, to whom he had once put the question, namely, that they got up into the Sally trees. It is true, he continued, that they are sometimes seen there, but then under very different circumstances, hanging by their tails. Mr. Rankin soon satisfied his inquirer that the buoyancy of the body and the paddle-shaped feet of the mole well adapted it to swimming, and that in flood time it was able so to transport itself to a place of safety. Another Irish gentleman then asked Mr. Rankin the reason why there are no moles in Ireland, but this, like many other Irish questions did not admit of such a ready solution, and our friend of the Emerald Isle departed still in the dark on the subject.

The description of a plant new to Britain, called *Muscaris comatus*, the fair-haired hyacinth, by Mr. B. Watkins, of Ross, was next read, and a dried specimen of the plant in flower was also exhibited. The account stated that the plant had been found in a wheat field on the Gillow Farm, Ross, where it is supposed its seeds were sown a few years ago with foreign corn or clover. It is a liliaceous plant, and may be often seen in our cottagers' gardens with the starch hyacinth and common cornflag, plants which, like the plant in question, are natives of the corn-fields of the south of Europe, and probably owe their introduction to this country to the same accidental circumstances. The fair-

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haired hyacinth is sometimes called the tassel hyacinth. Parkinson says, "The whole stalk with the flower upon it doth sometimes resemble a long purse tassel, and so divers gentlewomen have so named it." The account of the plant further stated that the seeds, when ground with wheat give pungent acridity to the bread.

The party now broke up, and while some of us again resorted to the churchyard to examine further the yew trees, others explored the Edw dingle to renew their acquaintance with the limestone ferns of the district, and most of us, after a pleasant stroll, reassembled in the orchard close by the "Mount," where we partook of tea provided for us by the kind and thoughtful hospitality of Mr. and Mrs. Mynors.

The district did not prove to be a very prolific one for the wild flowers of the season. The ferns met with in our rambles were maiden hair, spleenwort, *Asplenium tricomanes*, a variety of the common hard fern, *Blecknum boreale* brittle bladder fern, *Cystopteris fragilis*, green spleenwort, *Asplenium viride*, rigid three-branched polypodium, *Polypodium calcareum*, &c.

On taking leave of the Aberedw rocks we all admitted how much the good offices of Mr. and Mrs. Mynors and the Rev. H. Dew had contributed to the success and enjoyment of the excursion.

The third field meeting took place at Chepstow. On the morning of the 21st of July a goodly number of us left Hereford by the Gloucester train, and travelled as far as Grange Court station, when we took the South Wales line, through a very interesting country to Chepstow. Soon after we left Grange Court the "smooth Severn stream" came into view, winding its course through its old lake bed to the sea, where, the wise man says, all rivers flow. Further on we passed Lydney and its "black country," which forms part of the great coal field of the Forest of Dean. Lydney was for centuries the port where the iron ore was shipped that supplied the forges which formerly existed on the Wye and its tributaries. Even as late as the beginning of the present century iron was made at Tidnor forge, and there are many still living in the neighbourhood who can remember how the sound of the ponderous forge hammer used to echo along old Sutton Walls and the surrounding hills. Charcoal was used in the smelting process, which was brought from the woods of the district. It was not until long after its discovery that coal was used for smelting purposes, even at the forges in the immediate neighbourhood of the Forest.

Soon after we had passed Lydney we crossed the Wye on the tubular suspension bridge, that instance of Brunel's bold conception and ingenuity, whereby he contrived to carry the South Wales railway over the river at a high level and at the same time to conform with the requirements of the Lords of the Admiralty by not obstructing the navigation beneath it.

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At 12 a.m. we arrived at Chepstow, and after having inspected the interesting ruins of the castle, we took coach and proceeded along the Monmouth road to Piercefield. Henry Clay, Esq., the owner and occupier of this romantic spot, having heard that we were about to hold a meeting at Chepstow, had most kindly invited us to visit his grounds and partake of luncheon, but had expressed at the same time his regret that his absence from home would deprive him of the pleasure of acting as our guide on the occasion. In the absence of Mr. Clay, his son-in-law, the Rev. Walter Baskerville Mynors, was good enough to undertake that office, so as soon as we had entered the drive at the lodge gates we were met by that gentleman, who at once conducted us to the entrance of the walks at the upper part of the ground.

These delightful walks are about three miles in extent, and lead through overhanging woods which, with the rocks beneath them, form one of the main features in this part of the Wye scenery. They are situated about 200 feet above the river, and commands views of Chepstow, the castle, and neighbourhood, and the scenery on the opposite side of the valley, to which our attention was particularly drawn as we arrive at the alcove, castle view, platform, grotto, &c. Halting stations exist in the way, where openings in the dense foliage enable us to enjoy "the pick" of the scenery. The yew, the beech, the elm, with other trees, form a pleasant shade the whole way, while the ivy and the lesser periwinkle *Vinca minor* carpeted the ground beneath them.

One or two remarkable trees we met with on the way deserve to be here mentioned, for instance, a wych-elm, *Ulmus montana*, near the castle view, which stands in the centre of a spot rather raised above the surrounding ground and encircled by a belt of laurels, and like a mighty giant seems to guard the pass close by. It was difficult for us to arrive at a correct idea of the height of this splendid tree, as it was surrounded by others of considerable growth, but we ascertained that its girth, after making allowance for two strong ivy stems that were attached to the trunk, measured 19 feet, which rather exceeds that of the Moor Court wych elm. One of its lower branches is unfortunately broken off, otherwise it is a well-formed healthy-looking tree, and may continue to thrive a century longer. In the ancient statutes enjoining the use of the bow the wych-elm is mentioned, and not the common elm, *Ulmus compestris*, showing that it was then well known to consist of tougher stuff than that of its sister of the plain. Loudon on instancing another purpose for which the wood of this tree is used, mentions that in some of the midland counties, even at the present day, a little cavity is made in the churn to receive a small portion of the wych-hazel, without the which dairymaids imagine that they would not be able to get the butter to come.

Then another tree I may allude to is the beech at the "Half-way seat." It is rooted in the lime-stone rock, and is a strong limbed and well grown tree, and much resembles in its form a sturdy oak, for which it might readily be mistaken in mid-winter. Its girth at five feet from the ground measured 14 feet; many "*in memoriams*" of Jones, Brown, and other such well known names are inscribed on its trunk, one of which bears the date of 1769.

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At 1.30 we reached the mansion, a handsome building of Bath stone, commanding from its fine position varied and extensive views of surpassing beauty. Here we were met by H. Clay, jun., Esq., who conducted us to the dining-room, where a sumptuous and elegantly arranged luncheon was laid out, of which, on his having taken the head of the table, he invited us to partake. This acceptable repast having been fully discussed, and the kind hospitality of Mr. Clay duly acknowledged by us, we were again on our legs; but before we left the mansion some of us separated to view the richly decorated suit of apartments on the ground floor, while others ascended the grand staircase and examined the celebrated Gobelin tapestry, once the property of Louis XVI., on which are represented the various animal and vegetable productions of Africa. On the foreground of one of the pieces the lobster is represented "ready boiled," in the same condition in which that crustacean is introduced by the painter of "The Miraculous Draught of Fishes," who, on having been remonstrated with for his inconsistency, replied, "The greater was the miracle." After we had reassembled at the porch door, we resumed our walk through the grounds, and visited on the way the Smuggler's Cave, the romantic association of which vanished when the exploring party announced that the opening in the rock was the entrance to a heading which led to a descending shaft, and was evidently the work of some miners in their search of an imaginary treasure situated below the carboniferous limestone. Further on we halted at the "Lover's Leap," a spot protected by an iron railing, whence the views of Piercefield become blended with those of the Wyndcliff, and here we had arrived at the end of the grounds; so after having thanked Mr. Mynors for his kind attention, we joined our carriages at the Temple gate and rode to the edge of the Wyndcliff woods, where we alighted and struck off into a path which brought us to the top of the hill, then, after having descended a few yards to the right, we arrived at the "Terrace."

There 900 feet below the wooded rocks and crags which form the far-famed Wyndcliff runs the Wye, now a tidal river, beyond which lies the peninsular Llanwnt, a long stretch of alluvial land covered with verdant crops, and occupying the space which the river, by the assistance of the roadman and the lime-burner, has formed in the limestone rocks which bound its channel. Beyond this point the Double View and Tidenham Chase, and a long length of that sandy bottomed stream, "Sabrina is her name," where her sister Vaga, true to the last to her wandering nature, pours her accumulated treasures into her lap. Then in the far distance, on one side, we noticed the flat and steep Holmes and Penarth Point, and on the other, Kingroad, the mouth of the Avon, and the rocks and woods about Clifton.

While descending from the Terrace to the Moss Cottage, a good opportunity was offered us to observe the different varieties of trees that form the Wyndcliff woods, among which we noticed the guelder rose, *Viburnum ebulus*, wild service tree, *Pyrus torminalis*, bird cherry, *Prunus padus*, mountain ash *Viburnum lantana*, birch, *Betula alba*, holly, *Ilex aquifolium*, privet *Ligustrum vulgare*, and the yew by the thousand; most of these trees are natives of Britain, and being berry

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bearing trees, are probably self-sown. Having mounted our carriages again, at the point of the new road just below the Moss Cottage, we were soon conveyed to Tintern, the last place to be visited on the programme, and which we all considered to be a delightful "finish" to the day's excursion.

These ruins, and the picturesque country around them, which adds so much to their effect, have been like those of Chepstow Castle, so often described, and are so well known to every admirer of Wye scenery, that it would be superfluous in me to attempt to recount their merits here. Many of us had often contemplated them under more favourable circumstances, but even in this hurried visit we were able to discover some new feature of interest and beauty in them, and we left them to return to Chepstow, impressed with the feeling that if so grand in its desertion and decay, how magnificent this abbey must have appeared in the hey-day of its splendour and usefulness.

We reached the Beaufort Arms, Chepstow, for dinner, at 6 p.m., congratulating ourselves that there was no paper to be read, and that we had lost the edge of our appetite at Piercefield, for had it been otherwise, the paper must have been voted as read, and the dinner taken as "eaten," so short was the time at our disposal for such purposes. At 7 o'clock we were off for the return journey.

Our fourth field meeting of the season was held at the Forest of Dean on the 29th of August.

We travelled from Hereford to Ross with the 9.35 train, and thence by carriage *viâ* the Gloucester road to Hownhall turnpike, when we turned to the right out of the main track, and passed through Drybrook, by Holy Trinity Church, and over the high road that skirts the left side of the Cinderford valley, to the bridge of that name, which we crossed, and then entered the Speech House road, along which we drove until we arrived at our place of destination.

The Speech House stands in the middle of the Forest of Dean, and was erected in the year 1680. The Court of the Speech, or the miners and verderers court, was held there, at which some curious customs are said to have been observed; for instance, the forester on entering the court kneeled and delivered his horn to the Chief Justice; the miner did likewise, and presented his hatchet to his Lord, and the "Hands," or witnesses, were required to stand holding a piece of holly in their hand while the oath was being administered to them.

At 1.30 we commenced the walking part of the excursion, under the guidance of Mr. H. Southall, of Ross, who led off along the Coleford road. We first halted at the mouth of the Speech House Hill Pit, where we were addressed by Mr. Harris, of Ross, who informed us that the pit was 83 yards deep, and was worked at the Rocky vein, which is the lowest vein but one workable of what is called the upper series, which, beginning at the surface, is arrived at in the following order: Smith Coal, Lowrey, Starkey, Rocky Church Way, High Delf, and then no coal, or the "farewell rock." Mr. Harris further stated that the layers were about two feet in thickness, and the dip one foot in four; that the lower

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series consisted of Yorkley, or Yard Delf, Whittington Delf, Upper Tranchard, and finally Lower Tranchard. Fire damp is said to be quite unknown in this pit and in all the other pits in the forest, which circumstance—as Mr. Phillipps after dinner explained to us—is owing not only to the character of the coal, but also to the compact nature of its seams, and their freedom from those fissures which exists in the South Wales beds, in which the above-named explosive gas is too well known to collect. Some of us procured a few good specimens of fossil Calamites and Bothrodendrons of the foreman of the works, and none of us having expressed a wish to go 249 feet nearer our antipodes, we left the pit and descended the hill to the Pyroligneous Acid Works, where we struck off to the left and entered a shady part of the forest, through whose sinuous paths the botanists and mycologists soon dispersed themselves, and began to exercise their several pursuits. We all afterwards met at the "Ponds," where we rested awhile on its sloping banks and enjoyed the refreshing scene before us. This piece of water, so cool and placid to look on, and yet so unlooked for in the middle of the forest, is formed by the damming up of a narrow stream which issues from the gorge just above Cannop's Bridge, about a half-a-mile below which, its progress—having been arrested—it expands itself into a pretty miniature lake, and so transformed and sheltered by the neighbouring trees, it rests, while its clear and tranquil surface reflects the image of the woodland scene that surrounds it.

But time was hastening on, and we were compelled to resume our walk; so we crossed the dam at the head of the lake on to the opposite side, and then entered an enclosure, through which we proceeded until we emerged at the Coleford road, and half an hour afterwards we were all seated at dinner.

With reference to this by no means unimportant part of the day's proceedings, I may remark that a fine specimen of the Salmonidæ, *Salmo salar*, 30lbs. in weight, graced the head of the table, and the rest of the bill of fare was made up of items which equally expressed the liberal catering of our host of the Speech House.

After dinner Mr. V. P. Phillipps read a paper, in which he combined a short history of the Forest of Dean, with an account of its important productions, namely, its coal, iron ore, timber, and building stone. He also referred to its plants, birds, and other frequenters of it, not omitting that phantom deceiver, Will o' the Wisp. He spoke of the entire absence from the coal pits of any explosive gas, and the freedom with which the miners worked with underground lamps, and so fully do they believe in their security that at the Trafalgar works the levels are lighted with gas.

Next Mr. Lloyd exhibited a fresh specimen of a pretty floating aquatic plant with yellow blossoms, *Villarsia nymphoides*, which he had brought from Huntingdon pond, where he had introduced it. He remarked that it was a native of Holland and Denmark, and was sometimes met with in the Thames and in the fens of Lancashire.

Dr. Mc. Cullough also produced to the meeting a specimen of a plant new to Britain, sent by Mr. B. M. Watkins, of Ross, called *Melilotus alba*. It had

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been discovered by Mr. Scudamore growing in a clover field at Llangarren, where it is supposed to have been introduced with foreign seed.

Our business at the Speech House had now ended, so the carriages were ordered out and we drove through Coleford and Stanton to the foot of a hill on the left side of the Monmouth road, in which the Buckstone is situated.

This interesting object is a mass of conglomerate rock of an irregular pyramidal form, and rests at its apex on a slab of the same kind. It stands alone on the hedge of a hanging wood, about 2,000 feet above the level of the sea.

Its shape and position appears to be due to natural causes, and it very much resembles the "Devil's Pulpit," a large mass of rock, I believe, of a similar nature, which stands alone high up on the left bank of the Wye, about two miles below Tintern. Below the Buckstone is a remarkable valley of denudation, about a mile in width, which to all appearances has been formed in a mass of conglomerate, which once stretched from the Buckstone to the ridge of rock opposite to it, on which stands the Kymin. Large masses of conglomerate either crop up in the bottom of the valley or have been dropped there ages ago by the advancing glacier.

As the shades of evening were fast surrounding us we were obliged to leave the Buckstone and to defer the contemplation of the magnificent views that are visible from it to some other occasion, and so we rejoined the carriages and wended our way back to Ross through the busy town of Lydbrook, and by Bishop's-wood, where we arrived just in time to meet the return train to Hereford.

The oak and beach were the principal timber trees observed in the Forest. Some well formed sticks of which we met with on the unenclosed slopes near the Speech House, they averaged 16 feet in girth. In the same neighbourhood we saw some fine specimens of holly, many of which measured six feet, and are said to stand on the oldest part of the Forest.

The yew, the wych, and common elm were conspicuous by their absence, and so were all those berry bearing trees which we found so numerous in the woods we visited at our Chepstow meeting, but very probably many of them may exist in the enclosures, where every tree is allowed to grow until the ground be thrown open, when the woodman's hatchet begins its work, and the sheep are turned in, and so in a few years no trace of vegetation is remaining there but the timber trees and the rank grass and fern which grows beneath them.

The following is the botanical report of the day by Messrs. H. Southall and B. M. Watkins, Ross, to which is added the names of the Fungi gathered by different members, chiefly in the neighbourhood of the "Ponds:"—

"Leaving Mitcheldean Road about 7 a.m., we entered the forest by the Lea Bailey hill, and found growing on the slopes—Sclerochloa rigida, Aira præcox caryophyllea, and flexuosa, four rather elegant and rare grasses. After exploring the boggy uplands near the Wigpool, and the old iron workings in the neighbourhood, where Gentiana amarella, the little autumnal gentian is pretty plentiful, we next passed through an extensive enclosure, and there found the little milkwort Polygala depressa, two heaths, Erica tetralix and cinerea, the common ling,

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and also another beautiful and uncommon grass, Molinia cærulea, as well as Epipactis latifolia (the broad-leaved helleborine). We then proceeded by Drybrook, Nailbridge and Brierly to the Speech House, finding on the way Hyoscyamus niger, or Henbane, Erodium circutarium (Stork's bill), and many other interesting plants, Trifolium filiforme (probably) amongst the number. In the immediate neighbourhood of the Speech House, and in our explorations after dinner, we also observed Scutellaria galericulata and minor; Hypericum elodes (marsh St. John's wort); Narthecium ossifragum, bog asphodel; Anagallis tenella, bog pimpernel; Drosera rotundifolia, sundew; Drosera longifolia, noted previously; Filago minima (lesser cudweed); Senecio crucifolius (rag wort), The berries of Viburnum opulus and mountain ash thickly ornamented the woods, and the hedges were resplendent with those of the tamus, bryonia and solanum. Bidens tripartita, the burr marigold; the pretty little Neottia spiralis, or lady's tresses, and the dwarf thistle, Carduus acaulis, were also seen; also Colchicum autumnale (the autumn crocus), Butomus umbellatus (the flowering rush), Alisma plantago, water plantain, Pyrus aria, the white beam, &c., &c.

The following ferns: Lastrea oreopteris, Lastrea filix mas, Lastrea spinulosa, Lastrea dilatata, Lathyrium fœmina var. convexum, Lathyrium fœmina var. incisum, Pteris aquilina, Asplenium adiantum nigrum, Asplenium ruta muraria, Asplenium trichomanes, Scolopendrium vulgare, Ceterach officinarum, Blechnum boreale, Polypodium vulgare, Polypodium dryopteris, Polypodium robertianum, Polystichum aculeatum, Polystichum angulare, Equisetum palustre, Equisetum limosum, and Chara vulgaris.

List of Funguses.—Cantharellus cibarius, Russula rubra, fœtens, virescens, and the edible Russula heterophylla, Scleroderma verrucosa, Marasmius peronatus, Lactarius rufus, and subdulcis, and the large white acrid Lactarius piperatus, and several varieties of Hygrophorus.

The Annual Fungus Foray in October, was attended by so many distinguished mycologists, and was so successful in the number and rarity of the Funguses found and exhibited, that the report of the proceedings published at the time will be given in full as an Appendix, and I therefore pass it by.

I regret, however, that I cannot close this address without alluding to the death of one of our honorary members, a gentleman who filled the office of president in the birth year of the Club, and who it was said, always took a warm interest in its proceedings; I refer to our loss of Sir Roderick Murchison. You all know how connected his name is with Herefordshire, through his geological work on the Silurian system, which he conceived and so successfully carried out in this

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county. Many are the other works which he has left behind him, and which are and always will be much prized and looked up to by every geologist in Europe.

I may add that the weather, which always contributes so much to the success and enjoyment of these excursions, was on every occasion propitious. The attendances were quite equal to the average number, and eleven gentlemen were proposed and duly elected members. Looking at the condition of the Woolhope Club, which is just entering its 22nd year, I believe I may truly say that its popularity is well maintained, and that it continues to exercise its influence on us, and so developes and sustains our interests in the natural history of Herefordshire and the adjacent district. That its volumes of Transactions are well received and valued is evident from the warm expression of thanks with which they were received by the authorities of the British Museum, Bodleian and other large libraries were they have been sent.

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APPENDIX.

THE FORAY AMONG THE FUNGUSES.

TUESDAY, OCTOBER 10th, 1871.

The last Field Meeting of the year was held on Tuesday last. The attendance was numerous, the weather was beautiful, the scenery of the district selected for the hunt was very fine, yet, above and beyond all for the object of the day 's excursion, Funguses were abundant.

The sun shone brilliantly as the visitors left the Dinmore Station to wend their way up the hill to the tower on the top, but the admiration of the varied foliage tints was quickly exchanged for that of the forms and colouration of the Funguses met with. The scarlet tints of *Hygrophorus coccineus*, *Peziza aurantia*, and *Ag.* (Ammonita) *muscarius*; the amythist and purple variety of *Ag. laccatus*; the large white *Lactarius vellereus*, the delicate *Hygrophorus cossus*, and *Clavaria vermiculata*; the yellow wax-like *Hygrophorus ceraceus*; and hundreds of others in shades of yellow, brown, and black, mixed by Nature's art, with many a varied grace of form and texture.

Meantime the way led on, and whether it was due to the many attentions the Funguses offered, or to that old sad habit of keeping too long to the broad and easy path, the visitors found themselves on the turnpike-road to Leominster, without a sight of the tower. Away through the wood, side tracks were taken, and the baskets meanwhile were getting rapidly filled with the *spolia* of the day. In the hunt for the tower, which conceals itself wonderfully well in the woods of this wide-backed undulating hill, some found it, and some didn't, and the president was amongst the unfortunate; and so it came to pass that the business of the Club was transacted under the beech trees at the far side.

The following gentlemen were elected unanimously as the office bearers for the year 1872 :—

President: Elmes Y. Steel, Esq., Abergavenny.

Vice-Presidents: Dr. McCullough, Abergavenny; J. Griffith Morris, Esq., Hereford; James Rankin, Esq., M.A., Bryngwyn, Hereford; the Rev. T. Thistlethwaite Smith, Thruxton, Hereford.

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Central Committee of Management: T. Curley, Esq., C.E., F.G.S., Hereford; John Lloyd, Esq., Huntington Court, Hereford; C. G. Martin, Esq., Hereford.

Honorary Secretary: The Rev. Sir George H. Cornewall, Bart., M.A., Moccas Court, Hereford.

Treasurer and Assistant-Secretary: Mr. Arthur Thompson, St. Nicholas-street, Hereford.

The following gentlemen were elected members of the Club :—W. C. Gibson, Esq., Sugwas Court; F. H. Herbert, Esq., Credenhill Court; and H. G. Apperley, Esq., Hereford; and some others were proposed for election at a future meeting.

The Secretary announced that he had succeeded with some difficulty in purchasing, at full price, some of the back volumes of their Transactions, so as to make up two complete sets for presentation to the Free Library, and it was unanimously resolved that they should be presented forthwith, with the understanding that one copy only be allowed to circulate, and that the other should always be kept in the Library.

The publication of the Flora of the County, by the Rev. W. H. Purchas, was reported to be in progress, and after some other business announcements the book was closed, and the hunt for funguses again began.

The delicate, beautiful fungus *Agaricus mucidus*, white and fragile, was here gathered from a decaying branch of the beech tree above, and on its roots below *Polyporus giganteus* was beginning to grow. Here too, in the adjoining underwood, soon was smelt out that curious, undesireable, beautiful, horrid, graceful, disgusting, interesting, stinking fungus, *Phallus impudicus*, which is very justly named "stink-horn." It is usually found with pleasure and parted from with joy.

The wood was now left for the more open ground of the hill, and on the remains of some charcoal burning places the funguses peculiar to such spots, *Agaricus carbonarius*, *Aq. atratus*, and *Cantharellus radicosus*, were found.

The views from the hill, with Hampton Court in the rich and well wooded valley beneath, and the park on the rising hill beyond are exquisitely rich and beautiful, and were seen to great advantage on the present occasion. Mr. Arkwright had most kindly given the members of the Club full permission to trespass in all directions their fancy might lead them, and as the sun shone brightly on the mansion, with its very uppermost gable clothed in brilliant carmine by the autumnal foliage of the Virginian creeper, the desire to visit the gardens was irresistable.

The private bridge over the Lug was crossed—how considerately fortunate it was that the gate should chance to be unlocked!—and the gardens were soon reached. "What a magnificent lawn!" was the exclamation of a gentleman who saw it for the first time, "How beautiful the woods are!" "Yes," said another, "it has an atmosphere of its own, like all grand things, and must be seen therefore to be appreciated rightly." It well may indeed have its own aerial perspective, for the smooth, green surface stretches along the valley for a distance of some two miles, level as a lake. The views in this lovely valley were well

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seen in oblique light. Its hanging woods and groups of trees, the fine cedars, planes and other ornamental trees of the garden, all met with a share of the admiration they deserve—when the whistle sounded, and after a card of grateful apology, 42-fold strong, for the intrusion, had been left, the visitors carried off with them very bright recollections—"a joy for ever"—of their pleasant trespass.

Following some little distance a tempting glade by the river's side the ascent of the hill was again made for the home journey, and the fungus hunt was resumed all the more vigorously for the charming *hiatus* of the visit to the valley. The buff *Hygrophorus pratensis*—edible and good—with its odd little associate, *H. psittacinus*, and several others were gathered here. This last is said to be edible too, in spite of its greenish-yellow, untempting aspect—and as the esculent Funguses have at length come uppermost, it may as well be said at once that many varieties of them were found. A good dish of the "Maned agaric," *Coprinus comatus*, had already been secured as provision for the feast, and others had still to be gathered. A hunt was made for the "Vegetable beefsteak," *Fistulina hepatica*. for it may almost be said of this, as Browning has lately said of the Pomegranate in the Island of Rhodes:—

> "Where'er the red bloom burns
> I' the dull, dark verdure of the bounteous tree
> Dethroning in the rosy isle, the rose
> You shall find food, drink, odour, all at once."

but though some small specimens were found, they were too young to be fit for the table. The spiked mushroom, *Hydnum repandum*, "Hydnum good as oysters" as Dr. Badham says, was found growing in several localities and some fine specimens were gathered, but as this one had already been cooked at the dinners of the Club, the caterer passed them by, for the "Red Milk Agaric," *Lactarius deliciosus*, which is very plentiful this autumn in the situation it delights in, the drip of Scotch Firs. The Chantarelle, *Cantharellus cibarius*, was gathered, and very common it has been this year in almost every oakwood of the county. This and *Marasmius oreades*, the Fairy-ring agaric, or Champignon, have been extremely abundant all through the summer. If people did but know how strong and excellent the catsup it makes is they would not let it be thus wasted, though from its small size and rather dry nature it takes a deal of gathering to get a supply of this delicious condiment. Then there was *Agaricus orcella* "vegetable sweet bread," *Boletus edulis*, *Russula heterophylla*, *Agaricus rubescens*, *Lepista nuda*, and some others of which compassion for the compositor alone forbids the mention at this time.

Edible Funguses often get into discredit from being eaten when unripe. There is a common saying about the pear, that you should sit up all night to catch the minute it ripens, and if there is a basis of truth in the proverb, with a fruit that takes so many months to reach perfection, one ought to be electrically sensitive to the exact moment of maturation of a mushroom, which a few hours will suffice to develope.

An entomologist present noticed the following insects: *Vanessa atalanta*, and *Plusia gamma* were careering on the wing, enjoying the Indian summer.

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Miselia oxycantha was spied on the trunk of an oak—looking very closely similar to the lichens which grow there—and was forthwith speared with a long pin. *Xylina rhizolitha* was also caught at rest, and the larvæ of *Tortrix poasinana* and *Boarmia repandata* were also procured. The traces of the larva of the Clearwing, *Sesia culiciformis*, were also observed on a birch tree.

On the way through the woods many other Funguses were gathered, and by way of balancing the virtues of the edible kinds, it is well, perhaps, to mention that the virulently poisonous *Lactarius torminosus*, or *necator* "the slayer," as it is sometimes called, was very abundant, and a very beautiful agaric it is with its rich orange zones and its woolly margin. The venomous looking *Lactarius turpis* was frequently found, *Agaricus fasciculatis*, *Ag. sublateritius*, and some others.

One other agaric only shall be named, and that because it is very rare and so very interesting. On a stump not far from the station *Marasmius fœtidus*, the little fœtid marasmius were growing plentifully. More Lactarii and Cortinarii were met with than could be named, for some were either new, or in a peculiar form, and it is possible they may be heard of again at the Fungus Exhibition at the Green Dragon. Suffice it to say now that the tower was visited on the way back, and the station duly reached in time for the train.

The Club mustered strongly in the field. There was the President, Thomas Cam, Esq.; C. E. Broome, Esq., F.L.S., from Bath; Frederick Currey, Esq., F.R.S., Vice-President of the Linnean Society, Blackheath; M. C. Cook, Esq., M.A., London; Edwin Lees, Esq., F.L.S., President of the Malvern Field Club; Worthington G. Smith, Esq., F.L.S., London; the Rev. William Houghton, M.A., F.L.S., Preston, Shropshire; James Renny, Esq., London; the Rev. W. Allport Leighton, Shrewsbury; the Rev. H. Cooper Key, M.A., F.A.S.; W. H. West, Esq., Gliffæs; Dr. Bull; the Rev. J. D. Latouche, Stokesay; Dr. McCullongh, Abergavenny; J. C. Kent, Esq., Upton-on-Severn; the Rev. W. C. Fowle, Brinsop; W. C. Gibson, C.M.G., Sugwas; James D. Tremlett, Esq., Bengal; the Rev. R. H. Williams, Byford; the Rev. T. T. Smith, Thruxton; William Phillips, Esq., Kingsland, Shrewsbury; Charles Plowright, Esq., Kings Lynn, Norfolk; the Rev. J. F. Crouch, Pembridge; G. J. Jones, Esq., Watmore, Salop; the Rev. H. Bernard Marshall, Blakemere; Miss and Miss Marion Browne, Bournemouth; Lilburn Rosher, Esq., Trewyn; John Lambe, Esq., Hereford; George Cocking, Esq., Ludlow; the Rev. S. Thackwell, Birch; James Davies, Esq., Hereford; Dr. J. H. Wood, Tarrington; C. G. Martin, Esq., Hereford; R. W. Swinburne, Esq., South Shields; W. A. Swinburne, Esq., Hay; William Miller, Esq., Hereford; J. Griffith Morris, Esq., Hereford; T. Curley, Esq., F.G.S., Hereford; the Rev. A. G. Jones, Yarkhill; the Rev. J. H. Jukes, Hereford; B. P. Morrison, Esq., Hereford; Mr. Henry Newman, Leominster; Mr. Henry Southall, Ross; Mr. F. E. Harman, The Vallets; Mr. Alexander, Leominster; and Mr. Arthur Thompson.

They were joined at the dinner table in the evening by Sir William Guise, Bart., F.G.S., President of the Cotswold Field Club; Lieutenant-Colonel

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T. P. Symonds, Pengethley; the Rev. William Symonds, F.G.S., Pendock; the Rev. J. S. Clarke, Gowdhurst, Kent; J. F. Symonds, Esq., and Mr. Reginald Symonds, Hereford; R. Lightbody, Esq., F.G.S., Ludlow; Arthur Armitage, Esq., Dadnor; the Rev. Arthur Gray, Oroop; Dr. Chapman, Burghill; Thomas Turner, Esq., Hereford; Flavell Edmunds, Esq., and Mr. With, Hereford.

THE FUNGUS EXHIBITION.

With well laden baskets the Fungus hunters reached the Green Dragon, and all their fatigues were soon forgotten in close examination of the Funguses brought or sent for exhibition. Several of the scientific visitors who had come from long distances to be present at the Foray had brought rare specimens with them. C. E. Broome, Esq., F.L.S., from the neighbourhood of Bath and Bristol, brought the small truffle, *Genea hispidula*, from Hanham, near Bristol; *Poronia punctata*; *Peziza rutilans*, and *humosa*; *Polyporus Scoticus*; *Ag. Squarrosus* in its variety *Mulleri*; and many other sorts from Clifton and the Leigh woods. The Rev. Wm. Houghton, F.L.S., &c., brought two specimens of *Sparassis crispa*, which is so excellent in flavour that it is a pity it is so rare; *Agaricus clavipes* only of late added to the British Flora; and many others. Wm. Phillips, Esq., also brought from Shropshire *Peziza onotica* and *cochleata*; *Agaricus* (Clitocybe) *cyathiformis*: an unrecognised violet *Cortinarius*; (L.) *Lycogala epidendron*, &c.; Charles Plowright, Esq., brought with him from Norfolk the rare *Agaricus* (Mycena) *Iris*; the curious and rare *Cordiceps ophioglossoides* growing parasitically on *Elaphomyces muricatus*; *Boletus variegatus*, and many others. The Rev. J. Jones Machen, brought *Craterellus crispus*, &c. Miss Lewis, of Ludlow, sent *Cantharellus tubæformis* and many others.

The remaining collections are from Herefordshire. A large hamper came from Whitfield of fine kinds in excellent order; a good collection was also sent by Mr. Miller from Eywood, near Kington, containing the rare *Hydnum Zonatum*, with two very grand specimens of *Polyporus giganteus*. Many members of the Club also did their duty scientifically, and the tables were well crowded with specimens. Time, unfortunately, did not admit of their being well arranged for study, but this want shall be supplied in some measure here.

It will be an interesting feature if the Funguses gathered in Herefordshire at this meeting are put on record for the future. To prevent repetition, however, all those which have been already named in this account of the excursion will be omitted, and the names of the others well recognised upon the table shall be strung together in the most concise manner and without comment. This arrangement will give readers in general the pleasant advantage of skipping them in a lump.

In the great order *Agaricus* the following species were present:—

Amanita: Phalloides, pantherinus, excelsus, vaginatus, and Cecilise.

Lepiota: procerus, rachodes, excoriatus, Badhami, gracilentus, cristatus, and granulosus.

Armillaria: melleus.

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Tricholoma: sejunctus, flavo-brunneus, albo-brunneus, rutilans, imbricatus, Columbetta, murinaceus, terreus, saponaceus, cuneifolius, albus, personatus, nudus, grammopodius, humilis and subpulverulentus.

Clitocybe: nebularis, fumosus and its variety polius, odorus, cerussatus, dealbatus, infundibuliformis, geotrupus, and fragrans.

Collybia: radicatus, maculatus, platyphyllus, fusipes, butyraceus, dryophilus, undatus, vertirugis, tuberosus.

Mycena: purus, polygrammus, alcalinus, epipterygius, pelliculosus, pterigenus, galopus, and tenuis.

Pluteus: cervinus. *Crepidotus:* mollis.

Entoloma: sinuatus, Bloxami, nidorosus, and rhodopolius.

Clitopilus: prunulus, and popinalis.

Nolania: pascuus. *Pholliota,* spectabilis, mutabilis, squarrosus, and radicosus.

Hebeloma: lucifugus, longicaudus, fastibilis, and testaceus.

Naucoria: Cucumis, and furfuraceus.

Psalliota: campestris, arvensis, æruginosus, squamosus, and semiglobatus.

Hypholoma: lacrymabundus.

Psilocybe: Fœnisecii, spadiceus, and semilanceolatus.

Coprinus; atramentarius, picaceus, and niveus.

Cortinarius: Callochrous, collinitus, fulgens, elatior, tabularis, diabolicus, cinnamomeus, caninus, and callisteus.

Paxillus involutus. Gomphidius glutinosus, and viscidus.

Hygrophorus: Olivaceo-albus, virginius, niveus, cerasinus, ovinus, Colemannianus, coccineus, puniceus, and leporinus.

Lactarius: Insulsus, blennius, chyrsorrheus, pallidus, quietus, serifluus, subdulcis, glyciosmus, and fuliginosus.

Russula: Nigricans, adusta, furcata, vesca, rubra, sardonia, virescens, emetica, ochroleuca, fragilis, and alutacea.

Cantharellus: Aurantiacus, and tubœformis.

Marasmius: Urens, peronatus, and rotula. Lenzites betulina.

Boletus: Luteus, elegans, flavus, laricinus, granulatus, chrysenteron, luridus, scaber, versipellis, and badius.

Polyporus: Perennis, squamosus, quercinus, lucidus, betulinus, fomentarius, cuticularis, versicoler, and igniarius.

Trametes suaveoleus, Dædalia quercinæ. Craterellus cornucopioides. Calocera cornea. *Clavaria:* Formosa, cristata, stricta, fumosa, and rugosa.

Lycoperdon: Giganteum, cœlatum, saccatum, gemmatum, and pyriforme. Scleroderma vulgare. Cyathus striatus. Crucibulum vulgare. Helvella crispa. Leotia lubrica. Spathularia flavida. Thelephora laciniata. Peziza aurantia. Xylaria Hypoxylon. Merulius tremellosus. Helotium vulgatorum, and many others were also present on the tables, which time did not admit of being properly named by the mycological authorities who were present.

The collection on the whole was excellent, and afforded a fine opportunity of studying this difficult branch of botany under very favourable circumstances.

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THE EVENING MEETING.

The dinner took place about half-past four o'clock, when 52 gentlemen sat down, and some others were really obliged to leave for want of room. The specialities of the day need only be named. Few seemed to find out the *Oreades* catsup, but the maned agaric, *Coprinus comatus*, and the red milk agaric, *Lactarius deliciosus* were carried round by one of the members that all might have an opportunity of tasting them, which they did for the most part with considerable satisfaction.

The President (T. Cam, Esq.) gave the one loyal toast of the evening, which the rules permit, and after expressing the welcome of the club to the many illustrious gentlemen present, called on Dr. Bull to give a report of the fungological peculiarities of the year in Herefordshire.

Dr. Bull said he was not prepared with any special report of this nature, but felt no difficulty in complying with the president's wish. In the first place he must say that nothing could speak so much for the progress of the study of Funguses in Herefordshire as both the presence at that table of the many gentlemen so eminent in the science of mycology, and the numerous display of funguses upon the tables. Mr. Broome, of Bath, whose name in connection with the Rev. Mr. Berkeley was too well known to need any further comment. Mr. Currey, vice-president of the Linnæan Society, the editor of the late editions of Dr. Badham's elegant and classical work on "The Esculent Funguses of Great Britain," and several other publications. Mr. M. C. Cooke, whose name is perhaps more widely known than any other, from his work, "A plain and easy account of the British Fungi," an excellent book, and so cheap as to be within every one's reach. Mr. Cooke had, however, recently published a work in two volumes, "The Handbook of British Fungi," of which he had no hesitation in expressing his belief that it would be the text-book of the student for the next 20 years to come. Mr. Cooke had promised to his subscribers 200 illustrations and 300 pages of letter-press. He had given them over 400 illustrations and above 900 pages of letter-press. He had resolved, nevertheless, to keep good faith with his subscribers, and bear the extra expense himself (applause), and thus it had come to pass that Mr. Cooke had lost a very considerable sum of money by the publication of this great work, in addition, of course, to the very great labour of its production. This book was peculiarly acceptable to the members of the Woolhope Club. The first page he opened had on it the illustration of a Herefordshire Fungus, and there were some others there which had been found for the first time in Britain by members of our Club. The long notes, too, and the well-drawn figures had, very many of them, the initials "W. G. S." attached, initials which were pleasantly familiar to the members of the Woolhope Club. To Mr. Worthington G. Smith, the author of "Mushrooms and Toadstools," they were especially indebted, for he had come down year after year amongst them, and spared himself no trouble for their benefit and instruction. The Rev. William Houghton, M.A., F.L.S., so distinguished for his writings on Natural Science, and to whom the Club was indebted for a notice in the *Edinburgh Review*. Then

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there was Sir Wm. Guise, Bart., the President of the Cotswold Field Club, a good practical mycologist; Edwin Lees, Esq., President of the Worcester Club, who had ever been most kind and useful to them, and whom he trusted always to see at their meetings; the Rev. W. S. Symonds; the Rev. W. A. Leighton, of Shrewsbury; Mr. Phillips, who is always finding rare funguses; Mr. Plowright, who had come specially all the way from Norfolk, and brought many interesting Funguses with him; the Rev. J. D. Latouche, and others too numerous to mention. To one and all of these gentlemen the Club are greatly indebted for doing them the honour to come to their forays, and for giving them instruction so kindly and readily as they had done (applause).

Dr. Bull then said the fungus year had been peculiar. In Spring Morels were plentiful; Chanterelles and the Fairy-ring agaric had been very abundant all through the Summer, but the common Mushroom had been very scarce. To this scarcity it was probably owing that the Horse-mushroom had been much more commonly sold in the markets, and eaten instead of it, aided, he liked to think, to some little extent, by the teachings of the Woolhope Club that the Horse-mushroom was perfectly wholesome, and very good, though not quite so rich and agreeable as the ordinary mushroom.

Dr. Bull then concluded his remarks by reading some observations "On the edible Funguses of the Year," by James Buckman, Esq., F.R.S., late Professor to the Agricultural College at Cirencester.

The Rev. W. G. Symonds then exhibited a very interesting series of bones, of the mammoth, the cave lion, the bear, the rhinoceros, the reindeer, the European bison, all in good preservation, but showing marks on the edges of having been knawed by hyænas. They were found in the floor of King Arthur's cave in the Doward Hill above Whitchurch, some 20 feet below the surface, and some 300 feet above the present level of the river Wye. Mr. Symonds gave a very interesting account of the discovery, and the nature of the earth which covered the bones, tending to show the very lengthened period that must have elapsed since they had been deposited. Mr. Symonds address created some discussion. A paper "On the nomadic growth of Fungi, with reference to the germs that are found in snow and rain," was read by Edwin Lees, Esq., F.L.S., &c., &c. It was well illustrated by many careful sketches.

The evening had now considerably advanced, and after Mr. M. C. Cooke had given a few words of warm recognition of the hospitality shewn and work done by the Woolhope Club, the meeting adjourned to the residence of Mr. Cam, where a very pleasant and instructive evening was passed in listening to a well written practical paper entitled "Some remarks on the Cryptogamic Family Saprolegnia and its Alliances," by James Renny, Esq., and the able discussion to which it gave rise; and in examining a collection of rare Lichens, which had been brought kindly by the Rev. W. Allport Leighton, of Shrewsbury, author of "The Lichen Flora of Great Britain," and other botanical works.

So has passed pleasantly into history one of the most agreeable and instructive meetings of the Woolhope Club.

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OBSERVATIONS ON SOME OF THE EDIBLE FUNGUSES OF THE SEASON.

By JAMES BUCKMAN, Esq., F.L.S., &c.

Morchella esculenta—Morel.—In the "merrie moneth of Maye," as the antients have it, a friend kindly sent me some Morels, and upon the receipt of them I at once consulted Dr. Badham and Mr. Cooke upon the best way of preparing them, and at last my cook was desired to make a Ragout of Morels, according to the recipe given in that oracle of fungal cookery—"A Plain and Easy Account of British Fungi, by M. C. Cooke," (p. 107,) of which the following is a copy:—"Pick and clean your fungi, and cut them in two, wash and dry them well by wiping them, put them in a stewpan, with butter, place them over a brisk fire, and when the butter is melted, squeeze in a little lemon juice, give a few turns, and then add salt, pepper, and a little grated nutmeg. Cook slowly for an hour, adding at intervals small quantities of beef gravy or jelly broth. When done thicken with yolks of eggs."

When done the result is a side dish equal to anything we have ever had in this way either in Paris, New York, or London.

Agaricus gambosus, St. George's Agaric, or May Mushroom, was abundant and good this season, and occurred in all the rings in which I have found it in other years. Within 20 yards of a ring of *Ag. gambosus* about 20 feet in diameter was a ring of the *Ag. oreades*. This latter has kept on producing fungi from May until now, but the *Ag. gambosus* ring produced a crop of this fungus which was all over by the end of May, and in neither of the rings has there been a different species at any time from the ones mentioned. There is, however, a ring of *A. oreades* in one of my lower meadows, which likewise had a good crop of this fungus in May, while at the present moment the ring is occupied by *Lepista personatus* or Blewits.

Ag. oreades: Fairy Ring Agaric or Champignon.—These have been plentiful and in constant use in the house all the season. We cook them in every way possible, and use them either as a self dish or with almost anything, bacon, chops, chicken, game, all are improved by this fungus which we have found to be highly flavoured, and at all times perfectly harmless.

We have a ring on a sloping sandbank, in the meadow in front of the house which has furnished us with a constant supply of this delicious agaric. This ring is interesting as it has only started this season. It is not quite a perfect circle, but much as follows:—

The segment is not quite 6 feet in diameter, and as the bank is dry sand, it will be well to state how the ring seems to have started.

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In rolling the field for the purpose of cricket it seems that as the ground was damp and full of worm casts the soil had occasionally to be scraped from the roller. It was so thick as to kill the grass as it dried hard on the surface. Since then, as this was in 1870, the drought set in and in the moister summer of the present year the Agarics appear to have taken possession of a circle round the killed grass. Even this season there have been times when the fungi became dried up, but as this ring is so near the house the watering pot was used in the evening, and by this means a very constant supply has been obtained from this ring.

Agaricus arvensis: White Caps, or the Horse Mushroom of the rustics.—This fungus has been abundant this season, occurring in my meadows in rings more or less perfect in shape. *Ag. campestris* has also occurred here and there in the meadow, arable land, or garden.

The *Arvensis* is usually despised by the poor people, and hence is little known by the richer housewife, as they are seldom brought to market except in the black or ketchup state. To my mind, however, if got in good condition—just as its cap begins to expand—it is infinitely superior in flavour to the smaller species, and I quite think it one of the most delicious of the agarics. The smaller species, *Campestris*, has this year possessed less flavour than usual, but anyhow we never prefer it to the *Ag. arvensis*.

Lycoperdon giganteum: Giant puff-ball.—The first I ever saw of this was in a rick-yard, near Hereford. I had the satisfaction to get it cooked by simply frying in egg and bread-crumb, with a most satisfactory result to all who could be got to partake of it. I have found them on my farm as much as 3lb. in weight, but curiously enough this year it has refused to grow with me at all. Not so, however, the smaller sorts, as they have been abundant, and sometimes in rings. I make out two forms, as follows:—*Bovista plumbea:* the Small puff-ball.—Found in summer in rings. Very smooth and white externally—and *Lycoperdon cælatum:* the Embossed puff-ball, a larger species, both of which kinds I have eaten, and found very good. I am not sure of the exact identification of all the puff-balls, but when young I should not hesitate to eat any of them.

These are some of the notes I have made this season, and mostly from my own farm. I have not time to roam about the woods as I once could, but I feel more and more persuaded that Funguses may and ought to be partaken of more than they have been, and I wish every success to the Woolhope Club in their investigations in relation to a tribe of plants, many of whose members are not only highly nutritious but are capable of forming luxuries of the highest order.

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NOTES ON BRITISH INSECTIVORA.

By JAMES RANKIN, Esq.

Ladies and Gentlemen,—At the meeting of this Society at Downton Castle I had the honour of making a few remarks to you on the British Cheiroptera, or Bats; to-day I propose to say a few words on another order of mammals, which are to a considerable degree allied to bats, and which perform very much the same function on the earth as bats do in the air, namely, devouring insects.

The order of which I am about to speak to-day, indeed, derives its systematic name from the food which the animals belonging to it, for the most part, live upon. It is called Insectivora, or insect-eating animals.

I need hardly say that such a distinction would not be of any scientific importance in itself, but it is found that many of the animals which do eat insects are very similar in structure, and ought to be classed together; and, therefore, naturalists have availed themselves of this functional peculiarity to give a name to the whole order.

Whether the morphological structure of these animals is consequent upon their eating insects, or whether their eating insects is consequent upon their structure is a question upon which I shall not enter.

The animals composing this order are small—some very small indeed—the smallest known mammal, namely, the Etruscan shrew, belongs to this order. They are widely distributed all over the world. Many of them are nocturnal in their habits; some of them, as the mole, are subterranean. All of them have numerous conical teeth, and generally the number in the two jaws differs; the teeth of this order very much resemble the teeth of bats, especially in a gap frequently found between the front teeth or incisors. The body is sometimes covered with soft fur, sometimes with sharp spines. The feet have generally five toes, but often only four.

The feet are always plantigrade, that is, the sole of the foot is placed on the ground in walking as well as the toes.

The noses or snouts of the Insectivora are usually somewhat long and mobile, and in some species have a very complicated arrangement at the end.

Such, then, being some of the leading characteristics of this order, we must now inquire what are the animals which meet these requirements; in this country it will be found that the order is represented by the Mole (Talpa), the Shrews (Sorex), and the Hedgehog (Erinaceus).

I will now proceed to say a few words on each of these genera separately, and first I will take the Mole, whose systematic name is Talpa.

The common Mole (Talpa-europæa) is too well-known a creature to need any detailed description of its general appearance: it is, when seen above ground, a

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long, thick-bodied, short-legged, inert looking animal, but in relation to its subterranean mode of life, its structure is most admirably adapted, and it is said that the mole has, in proportion to its size, more muscular power than any other quadruped, and so far from being an inert animal it is exceedingly active and fierce, and frequently engages in mortal combat with its companions of the same sex.

The cylindrical form of the mole must strike everyone as most suitable to an animal moving through earth, and in passing the hand over the body of a Mole, no projecting angles can be felt which would be likely to impede progress.

The fur with which the body of the mole is covered is very silky, and the set is such that the fur lies smoothly in almost every direction ; this is one reason why the fur of the Mole is always found free from soil.

The fore feet and arms of the Mole are very well worth attention. The whole apparatus connected with the fore limbs is very strong and muscular. The shoulder blades are long, and give a large surface of attachment for the muscles, and the bones of the arm, and especially of the fore-arm, are very thick and bowed, and the extensor muscles of the arm, and the flexors of the fingers are very strong. The toes are connected together, and the claws are long and strong, and the soles of the fore feet are turned backwards, like the palms of the hands of a swimmer ; indeed the whole motion of the Mole through the ground may be compared to that of a swimmer, but in a very much denser medium than water.

The teeth of the mole are sharp and pointed, and the back teeth or molars have tubercles ; the incisors or front teeth are six in the upper and eight in the lower jaw ; sometimes, however, only six in the lower jaw. The back teeth or molars are eight in number in the upper jaw on each side, and seven in the lower, making altogether 44 teeth. The food of the mole consists of insects and worms.

Moles, like most other animals, have five senses, namely, those of hearing, seeing, smelling, tasting, and touching, but of these the sense of hearing is very acute, and the sense of sight very dull. It is remarkable that the sense of hearing should be so good, as moles have no external ears.

It is a mistake to think they have no eyes, but one easily made upon a superficial examination of the animal, for the eyes are so small and so deeply hidden in the fur that it requires considerable search to find them, and the sight must necessarily be very imperfect ; but for subterranean animals sight is, of course, a superfluous sense as there is no light. The sense of touch is very highly developed, and resides chiefly in the prolonged snout of the mole. It is supposed also that the sense of smell is well developed, and to judge from the voracious appetite of the animal that of taste also.

It would be an incomplete notice of the mole if I did not make some mention of the subterranean dwelling in which this animal lives, and this subject indeed possesses a peculiar interest to many members of this society, as it bears very directly upon a well-known theory advanced by one of our most eminent members to account for the mode of growth of certain fungi.

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Moles make a variety of subterranean passages according to the age and sex of the borer. Small and frequent mounds thrown up from a tunnel made near the surface of the ground are said to be the work of the female mole when she is not able to make deeper burrows. These passages take no positive direction. The two chief architectural works of the mole are the fortress and the nest.

The fortress consists of a small hillock made of compact earth. Near the summit of this mound or hillock is a circular gallery, and another gallery near the bottom. These two galleries are connected by five short passages. In the centre of the hillock is a spherical chamber connected with the lower gallery by three passages, and out of the spherical chamber there is a large passage leading under the lower gallery and into one of the great high roads which connect the fortresses; also a number of smaller burrows radiate from the lower gallery. This is the home of the mole in the winter and during hours of repose, and by the complicated arrangement of passages it is able on the approach of danger quietly to slip away.

The nest is a simpler structure than the fortress, and placed generally some distance from it, and often in a bank of a ditch. It consists of a large circular chamber, which is at the breeding time in April and May filled with leaves and moss.

It does not appear, therefore, that any of the passages of the mole are always made in a circular form, except those in the fortress, but no doubt occasionally it may be convenient for the mole to adopt this form of tunnel.

Passing on now to the next genus of British insectivora we come to the shrews belonging to the genus Sorex.

There are said to be 4 different species of British Shrew, but it is possible these are only varieties; however this may be they are distinguished by the titles of the common Erd Shrew (Sorex-vulgaris), the Water shrew (Sorex-fodiens), the Oared Shrew (Sorex-ciliatus), and the Rustic Shrew (Sorex-rustica.)

The first two of these are very common in England, the third less so, and the fourth is found frequently in Ireland but rarely in England.

The whole appearance of the shrews is so much like that of a mouse that most unscientific persons would at once class them together; it is only necessary, however, to compare a shrew's and a mouse's mouth to see at once that they are very differently formed animals; the mouse has only two large incisor teeth in each jaw, then a wide gap, then three molar teeth with flat crowns; whereas the shrew has six sharp incisors in the upper and four in the lower jaw, which latter stick out nearly horizontally, and a number of tuberculate molars. The teeth alone therefore are quite sufficient to separate the shrews from the mice; these latter animals belong to the order of Rodents and are allied to the rabbits, rats, &c., and their diet is entirely vegetable; the shrews on the other hand feed upon insects and insect larvæ.

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The nose of the shrew is elongated, and like that of the mole serves as a very perfect instrument of touch.

The colour of the Erd shrew is a brown on the back and an ashy white underneath; it has five toes, which are cloven.

The habits of the shrew are not unlike those of the mole, for it makes burrows through the ground, which serve both as hunting ground and protection. Its nest where it deposits its young is not in the burrow, but is a hole in some bank or in the ground. It usually produces from five to seven young in the spring.

It is a popular belief that the bite of a shrew mouse is poisonous, but for this there is no foundation; but the dislike that cats and other feline animals have to eating shrews may be to some extent explained by the powerful and disagreeable odour emitted from the shrew's body.

It is found, however, that owls will eat shrews, as pellets, disgorged by owls, have been found to contain the bones of the shrew.

It has often been remarked that in the autumn bodies of dead shrews are found lying about upon paths and other bare places, and the reason of this has often been discussed.

The most likely cause for it seems to be that towards autumn the earth becomes too hard to allow the shrews to burrow in search of insect food, and that they consequently starve and die upon the surface; and although there are as many lying upon the grass as upon the paths they are not so apparent. And that they should be permitted to lie undevoured by the cats, stoats, &c., is explained by the fact I have already mentioned, that their odour is too unpleasant for the taste of these animals.

The water shrew (Sorex fodiens) is very similar in appearance to the Erd shrew, but darker on its back and whiter beneath; it has also a fringe of stiff white hairs edging the tail and the toes. Its habits are natatory, and it lives in holes in banks by the water.

The Oared Shrew (Sorex ciliatus) is the largest British species, and resembles very closely the water shrew, but is not so dark in colour on the back or so white underneath.

The whole family of shrews is a harmless set of little creatures, and are often very useful in destroying noxious insects. Professor Owen says that in moles and shrews the milk teeth are developed and have disappeared before birth.

I must now pass on to make a brief notice of the last British representative of the order insectivora; namely, the Hedgehog (Erinaceus Europœus). This animal, as its trivial name implies, is an inhabitant of the most part of Europe, and it is found all over Britain. Every one will know the general appearance of the hedgehog, with its pig-like snout and effective defensive armour of bristles, so well that I need not enter upon any general description, but will merely notice some less obvious points of the hedgehog's structure and habits. The

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hedgehog, like other insectivora, is supplied with numerous sharp and strong teeth, 36 in number, which are well adapted for crunching the hard and horny elytra of beetles, and also for crushing the bones of mice and snakes which the hedgehog eats as well as insects. The front or incisor teeth of the hedgehog resemble those of the bats in the peculiar gap that exists between the front teeth of the upper jaw, which are six in number; the incisor teeth of the lower jaw project like the shrews—nearly horizontaly. The hedgehog has five toes on each foot, all of which are separate. The snout is not so prolonged as the mole's or the shrew's, but still is a flexible and sensitive organ of touch as well as of smell. But the leading peculiarity of the hedgehog which would serve easily to distinguish it from all other animals, except perhaps the porcupine, is its armour of spines. These spines are about an inch long and very sharp at the point, and are held firmly in their place by a kind of head underneath the skin, and the animal has the power by means of an unusual development of a muscle called the panniculus-carnosus, which runs all over the back and sides, to roll itself completely up into a ball, and in so doing causes the spines to stand up erect and point out like a number of bayonets in every direction. So rolled up and protected there is hardly any animal which dares to attack the hedgehog; this power of rolling itself into a ball, combined with the elasticity of the spines' enables the hedgehog to let itself drop from great heights without sustaining any injury. The hedgehog is nocturnal in its habits, but frequently may be seen in daylight.

Although not a fossorial animal, like the mole or the shrew, yet it has considerable power of digging in the ground after insect larvæ. Its sense of smell is well developed.

The home of the hedgehog is usually some hole in an old rotten tree, or among old buildings or walls. They produce three or four young at a birth about the month of May. The young are born blind, and also have their ears closed. The quills are at first soft and white.

Hedgehogs are hibernating animals, and spend the winter for the most part in a state of sleep. They can, however, be easily roused out of that condition. Like other animals in that condition their respiratory function seems to be almost inactive.

Like most of the other animals of this order, the hedgehog has has attributed to it mischievous propensities, amongst the principal of which is the charge of sucking cow's milk.

This idea has probably arisen from the fact that the hedgehog has been occasionally observed to lick up the milk which had dropped from a cow before it was milked.

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The Woolhope Naturalists' Field Club.

ANNUAL MEETING.

FRIDAY, MARCH 1ST, 1872.

The Field Club held its Annual Meeting at the Green Dragon Hotel on Friday, March 1st, at 2 p.m., when the following gentlemen were present:—Thomas Cam, Esq. (President), in the Chair; Dr. M'Cullough, J. G. Morris, Esq., Rev. T. T. Smith (Vice-Presidents), and Messrs. F. Edmunds, T. Curley, John Lloyd, C. G. Martin. H. G. Harman, T. W. Herbert, W. A. Swinburne, D. Lawrence, Rev. Jones Machin, Rev. J. H. Jukes, Rev. F. Merewether, Rev. C. J. Robinson, Rev. C. J. Westropp, Dr. Chapman, Rev. R. H. Williams, W. Lawrence, T. Salwey, and A. Thompson (Assistant-Secretary).

The Treasurer's statement of accounts for the present year was read and adopted. The Meteorological Report for 1871, by E. J. Isbell, Esq., and the Register of the Flood of the Wye, by John Lloyd, Esq., were presented to the meeting.

A letter from Edwin Lees, Esq. (President of the Malvern Field Club) was read, which suggested a joint meeting of the Woolhope and Malvern Clubs in the Malvern district; also one from the Rev. Thomas Phillipps, which proposed on the part of Colonel St. Aubin (President of the Bath Field Club) a joint meeting of the Woolhope and Bath Clubs at Malvern.

Both applications were duly considered and the following appointments were made for the Field meetings of the year:—

Friday, May 17th, at Malvern, to meet the Malvern and Bath Clubs.

Friday, June 21st, at Pontypool.

Friday, July 19th, the Ladies' day, at Bredwardine, and pic-nic on Meerbach-hill.

Friday, August 28th, at Tenbury.

The usual Fungus Foray to take place in October, day and place of meeting to be fixed by the Central Committee.

The report of the Hereford Free Library and Museum Committee was read and adopted. It mentioned the success that had attended the opening of the Free Library and Reading-room at the temporary premises in King-street, and urged the members of the Club, one and all, to use their best endeavours to

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provide specimens of the various branches of natural history, so that the museum, when it shall be opened, may be a credit to the scientific men of the county.

J. Symonds, Esq., and the Rev. G. B. Bennett, vicar of St. Peter's, Hereford, were elected members.

A supplementary note on the bones discovered in making the sections of the Island of Llangorse, by Henry Dumbleton, Esq., was read. It stated that the bones had been submitted to Professors Owen and Rolleston for their opinion on the period of deposition, both of whom considered the remains to be that of the hog, horse, sheep, and Bos longifrons; but the fact of the domestication of the Bos longifrons having been admitted, rendered very uncertain the age of the deposit at the Island of Llangorse.

Letters of acknowledgment of the transactions of the Club from the Librarian of the British Museum, Bodleian Library, and Hereford Free Library, were read.

Dinner was served at 4 o'clock, when Elmes Steele, Esq., of Abergavenny, (president elect), Rev. H. Cooper Key, and Dr. Bull joined the company. After dinner the President read his retiring address, which was a *résumè* of the proceedings of the Field Meetings of the past year. An animated discussion followed on some interesting questions respecting the yew tree, to which the President had alluded, in which Mr. F. Edmunds took part, pointing out the abundance of that tree on the Hatterell range of hills, reiterating his opinion that the yew tree was indigenous to Britain, had retained its name *Yw*, and that the Romans found it here when they arrived in this country. He pointed out also the lesson derived from the presence of the yew on the slopes of Reman camps, as the Herefordshire Beacon, Kenchester, Old Sarum, &c., and his remarks met with the general approval of those present.

A paper by James Renny, Esq., was then read, which described "Some species of the genus Ascobulus new to England." These microscopic fungi were beautifully illustrated by original drawings made by the author, which show him to be no less an artist than he is a keen and correct observer in this interesting branch of Natural History.

The proceedings of the annual meeting were thus brought to a close.

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METEOROLOGICAL NOTES. ACCOUNT OF SOME BAROMETRICAL MEASUREMENTS OF HILLS IN HEREFORDSHIRE. ALTITUDES FIXED BY ORDNANCE AND OTHER SPIRIT LEVELLINGS.

By EDWIN J. ISBELL, Esq.

A very severe frost marked the end of 1870 and the beginning of 1871. The mean temperature of December, 1870, at Hereford, was 32°·5 and that of January, 1871, 32°·2, whilst, according to Mr. Glaisher, the average mean temperature of January at Greenwich is 36°·9, and that of February, 38°·7.

The yearly mean of 1871, however, was not a remarkably low one, for it amounted to 48°·46, and Mr. Glaisher informs us that the temperature of an average year at Greenwich is 49°·02.

The amount of rainfall for the whole year did not exceed that which we regard as our average quantity, viz., 27 to 28 inches. At Richmond-place I registered 27·738 inches. It is true some of the returns as shown in the rainfall table give larger quantities, but the yearly average alluded to above is strictly that of Hereford and its immediate neighbourhood. At Pool-cottage, Titley, and Rocklands, an average yearly rainfall exceeds 30 inches by a few decimals.

The fall of rain during the month of September was unusually large, the monthly total registered at Richmond-place being 6·317 inches. On the morning of the 7th of this month 1·340 inch was measured and on that of the 30th 1.221 inch.

On the evening of Sunday, August 13th, a tremendous thunderstorm burst upon Dinmore-hill and was felt over a large extent of the surrounding country. The fall of rain is said to have been extraordinary. I was in the village of Wellington at the time, and feel satisfied that the lightning and thunder were never equalled by anything of the kind I ever experienced, with the single exception of the terrible thunderstorm of 1852, when the spire of Ross church was struck. I had no means of measuring the rainfall at Wellington, but it must have been something very great, though small, I suppose, compared to that which came down at the centre of the storm. A farm on the hill was struck by the lightning and partially consumed.

The yearly mean of barometric readings around England, at the sea level, is 29·95 inches. The yearly mean of 9 a.m. readings at Hereford this year is 29·735 inches, the cistern of the standard barometer being 187 feet above the level of the sea. The Hereford observations are corrected for capillarity and index error, but not reduced to sea-level readings.

In connection with this subject it may be well to give a short account of the barometric measurements of some of the hills in the neighbourhood of Hereford made by simultaneous observations with the two standards.

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HATTERAL HILL.

August 3rd, 1870.—A careful reading was taken at the Pandy station, 345 feet above sea-level by levelling, and another on the top of that portion of the Herefordshire Black Mountain which is marked Hatteral Hill on the Ordnance map, as soon as the summit could be reached.

On the return to Pandy a second observation was made, and the mean of the two lower readings taken and found to be 29·434 inches, corrected.

The reading on the top of the mountain, corrected, was 28·032 inches. The difference between the higher reading and the mean of the two lower ones was 1·402 inch, the mean temperature 73°, and the deduced height, calculated by means of Negretti's tables, 1386·5 feet. If to this measurement we add the height of the Pandy station above the sea we shall make the full height of Hatteral Hill 1,731 feet 6 inches.

At the same time that I made my barometric observation on the top of Hatteral Hill my daughter made another at Hereford, and the difference between the two barometers was found to be equal to 1570·9 feet in perpendicular height. Add to this 187 feet, the height of my barometer above the sea, and the altitude of the mountain above sea-level will be 1,758 feet or nearly so.

At first sight a difference of 26 feet may appear very great, but the distance between the barometers—15½ miles—was also very great (far too great in fact for accuracy, one observation only being taken), and yet even at that distance a pretty close approximation to the actual height of the mountain was evidently gained, and the mean of half a dozen observations would probably have given the height to a foot.

GARWAY HILL.

Garway Hill was measured a second time on October 2, 1868. The day was calm and everything most favourable. Three barometric readings were taken simultaneously at intervals of half an hour each, both on Garway and at Hereford.

The mean of the three barometric readings at Hereford was 29·928 inches corrected; and the mean of the three readings of the detached thermometer 50·7.

The mean of the three barometric readings taken on Garway was 28·832 inches, corrected, and the mean of the three readings of the detached thermometer 47°·0.

The barometric difference between Hereford and Garway was 1·096 inch, and the mean temperature (Hereford and Garway) 48°·8. This, allowing for height of barometers from the ground, showed an altitude of 1,013 feet 10 inches; or, in round numbers, 1,014 feet. Add to this 182 feet, the height of Richmond-place above the sea, and we have 1196 feet, for the height of our mountain. The Ordnance Survey determines it to be 1,197 feet. As the barometers were 10½ miles apart this was a most satisfactory instance of barometric measurement.

LADY-LIFT.

The mean of two measurements (February 5th and July 19th, 1869) is 739 feet above Hereford and 921 feet above sea-level. The distance, however, from Hereford is 9½ miles in a straight line, so that it would be satisfactory to make some more measurements and then take the mean of the whole.

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ACORNBURY HILL.

Our last and most satisfactory measurement of this hill was made on the 26th of September, 1868. Three barometric observations were taken both at the higher and lower stations, the barometer falling slowly and steadily all the time. Barometric difference between upper and lower stations 0·765 inch; mean temperature 58·3; height of hill, 735 feet 6 inches; height above sea-level, 915 feet; distance between barometers, 4 miles 2½ furlongs.

SEAGER HILL, N.E. OF WOOLHOPE VALLEY.

On my first visit to this hill, in company with the Rev. R. Dixon, I had the misfortune to break both my thermometers (at least my boy broke them for me) just as we reached the summit. However, we made a guess at the temperature and took barometric observations at three points with the following results:—1st station, 700 feet; 2nd, 698 feet; 3rd, 658 feet above Hereford, or 882, 880, and 840 feet above sea-level. A second barometric measurement, both attached and and detached thermometers being used, made the highest point 704 feet above Hereford, and 886 feet above sea level. In this measurement the distance between the barometers was 7½ miles.

EGDON HILL.

I visited this hill in company with Dr. Bull, I think, in 1868. There is nothing imposing in its appearance; in fact the rise is so gradual that one gets to the top almost without noticing any particular hill. The people in the neighbourhood, however, believe it to be as high as the Malvern Beacon.

The corrected readings were as follows:—Hereford, 30·048; Egdon-hill, 29 347; difference of barometers, 0·701 inch; mean temperature, 62·1; height above Hereford, 660 feet; above the sea, 841 feet. Distance between barometers, 10 miles.

CREDENHILL.

The last measurement was made January 9th, 1869. The height calculated was 530 feet above Hereford and 712 feet above the sea. Distance between barometers 4 miles 3½ furlongs.

THE HOUGH WOOD.

Measured last on September 23rd, 1868. Height 440 feet above Hereford; 622 feet above the sea. Distance between barometers 5 miles 7 furlongs.

DINEDOR.

Last measured on September 21st, 1868. Height 423 feet above Hereford and 605 feet above the sea. Distance between barometers 2 miles 4 furlongs.

WHITFIELD HOUSE.

The lawn in front of Whitfield House is by barometric measurement 245 feet above Hereford, or 427 feet above the sea. This last measurement of altitude I

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am, however, anxious to repeat, and there are others in view, but the Woolhope instrument has been many months in London, and until its return our work must stand still.

With respect to the winter since January 1st, I have only to remark that it has been very unusually mild and very wet. In fact the temperature of January and February has been extraordinary, and I regret I have not time at this moment to calculate their means.

The rainfall of the two months as measured by my guage at Richmond-place is as follows :—January, 4 753 inches ; February, 3 391 inches. Total, 8·144 inches.

The falls have not been very great at any one time, but they have been very numerous, especially by night, so that the ground has been constantly wet.

In the neighbourhood of hills the rainfall has been still greater than at Hereford. Mr. Key has, I believe, registered more than I have. Credenhill, I suppose, and the high land to the north of it drawing the clouds that way.

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THE REMARKABLE TREES

OF

HEREFORDSHIRE.

THE ROSEMAUND OAK, 1870.

(Q. Pedunculata.)

This grand old Oak is growing in the Oak Meadow at Rosemaund, Felton, on the estate of Henry Pitt, Esq. Its circumference at 5 feet from the ground, avoiding excrescences as far as possible, gives a fair measurement of no less than 34 feet. It is quite hollow, the opening on the side opposite to this view is fitted up with a doorway, and seats are placed round the inside, so as to convert it into a Summer House, large and roomy. *(See Transactions for* 1870, *p.* 290—8.*)*

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SOME ORDNANCE BENCH MARKS IN HEREFORDSHIRE.

		Above the sea. FEET.
Hay	Corner of B'ue Boar inn at junction of Oxford-street and Church-street	337·979
Whitney-bridge...	North parapet of bridge	238·555
Winforton	West side of Church tower	226·437
Willersley	North parapet of bridge, over stream	215·774
Eardisley	South-west corner of tower	255·684
Kinnersley	South corner of church tower	271 511
Sarnesfield	South-east corner of church...	353·426
Weobley	South side of door entrance to south-west transept	316 300
Dilwyn...	Buttress at north-east corner of church	294·224
Golden Cross ...	By Ordnance map	305
Monkland	North-west buttress of church tower...	245·562
Leominster	South side of north entrance to Townhall	250·478
Kimbolton	Tower, west side entrance	415 824
Leyster's Pole ...	South end of Leyster village	618 028

ALTITUDES ALONG THE RAILWAY FROM HEREFORD TO HAY.* DECIMALS OMITTED.

		Above sea level. FEET.
Levels of rails at	Hay	254
,,	,, Whitney Station	259
,,	,, Eardisley	230
,,	,, Moorhampton	337
,,	,, Credenhill	251
,,	,, Moorfield	179
,,	,, Barton	175
,,	,, Barr's Court...	174
,,	,, on bridge over canal at Widemarsh	184

ALTITUDES OF RAILS ON A PORTION OF THE NEWPORT RAILWAY.

		Above sea level. FEET.
Levels of rails at	Tram Inn Station	289
,,	,, St. Devereux	281
,,	,, Pandy	345
,,	,, Llanfihangel...	472
,,	,, Pontrilas	365
,,	,, Abergavenny	236

EDWIN J ISBELL.

* Furnished by T. D. Roberts, Esq., C.E., Brecon.

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TABLE I.

1871.	BAROMETER. Highest reading at 9 a.m., corrected but not reduced to sea-level.		Lowest reading at 9 a.m., corrected but not reduced to sea-level.		Monthly Means of 9 a.m. readings.	WIND. N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
						Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.
	INCHES.	DATE.	INCHES.	DATE.	INCHES.								
January	30·077	27th	28·583	16th	29·618	1	6	0	3	2	2	2	5
February	30·243	22nd	29·115	10th	29·788	2	2	1	3	6	4	5	0
March	30·301	29th	29·302	16th	29·842	6	3	0	3	4	6	0	4
April	29·998	7th	28·919	19th	29·624	0	0	6	2	3	12	3	2
May	30·177	7th	29·610	25th	29·909	1	9	1	2	0	1	5	4
June	30·107	26th	29·352	19th	29·752	6	7	2	3	3	2	1	4
July	29·956	6th	29·191	26th	29·636	1	0	0	1	10	11	5	2
August	30·282	28th	29·197	18th	29·509	2	2	3	2	11	5	3	0
September	30·138	14th	28·952	27th	29·719	0	11	3	4	2	2	2	2
October	30·240	13th	28·999	1st	29·728	1	2	2	4	13	5	2	2
November	30·208	19th	29·287	8th	29·814	2	11	1	5	1	0	4	5
December	30·308	13th	29·095	28th	29·888	3	0	0	3	11	6	2	3
Yearly Mean of 9 a.m. readings					29·735	25	53	19	35	66	56	34	33

Cistern of Barometer 187 feet above sea-level.

EDWIN J. ISBELL.
WILLIAM COOKE.

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TABLE II.

THERMOMETERS.

1871.	Highest reading in shade; and date.		Lowest reading; and date.		Mean of maximum readings.	Mean of minimum readings.	Mean of 9 a.m. read. in shade.	Monthly means.
	Degrees.	Date.	Degrees.	Date.	Degrees.	Degrees.	Degrees.	Degrees.
January	47·5	6th	7	1st	37·83	27·47	31·87	32·25
February	55·4	18th, 19th	28·1	2nd	49·16	38·25	42·98	43·30
March	68	24th	27	17th	55·03	35·99	43·99	44·51
April	64·4	27th	27	8th	58·76	41·89	50·44	48·82
May	85·2	24th	31·0	11th	68·31	42·43	54·77	53·67
June	76·2	1st	34·4	5th	67·49	47·40	55·64	59·90
July	80·1	17th, 18th	43·1	31st	71·10	52·56	64·30	59·93
August	89·3	12th	42·1	1st	78·62	52·29	65·08	63·75
September	78·2	1st	33·2	23rd	64·88	47·97	56·25	55·12
October	67·2	18th	28·0	10th	59·33	41·57	50·46	49·45
November	51·7	14th	21·4	13th	44·52	31·69	36·62	37·70
December	50·4	18th	17·1	9th	44·62	31·11	37·19	37·86

Yearly Mean Temperature 48·46.

Thermometers 4 feet above ground and 186 feet above sea-level.

EDWIN J. ISBELL.
WILLIAM COOKE.

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TABLE III.

RAINFALL IN HEREFORDSHIRE.

1871.	Hereford. Richmond-place. 5ft. 8in. from the ground.	White-cross, 1 mile from Hereford. 1ft. from the ground.	Fownhope Vicarage. 13 inches from the ground.	Tupsley, 1 foot from the ground.	Stretton 1 foot from the ground.	Leominster. 1 foot from the ground.	Sellack. 5 in. from the ground.	Archenfield, Ross. 1 ft. from the ground.	Rocklands, 1ft 11in. from the ground.	Hagley Park. 6in. from the ground.	Staunton-on-Wye. 1ft. from ground.
January	2·677	2·585	2·23	1·79	2·53	2·68	2 17	2·26	2·69	1·97	3·26
February	1·311	1·843	1·54	1·37	1·35	1·58	1·52	1·65	2 33	1·29	1·43
March	1·113	1·443	1·42	1·38	1·25	1·38	1·12	1·24	1·96	1·47	1·15
April.....	2·099	2·070	2·44	2·24	2·12	2·71	2·25	2·72	3 23	2 16	2 36
May	0·997	0·880	0·84	0·88	0·95	0·95	0·77	0 92	0 86	0 92	0 91
June	2·896	3·098	2·48	2·90	3·72	2·71	2·86	2 28	2 01	2 68	2·41
July	2·996	3·056	3·75	2·88	3·14	3·04	4·03	4 20	4 17	2 97	3 02
August	1·561	1·567	1·62	1·68	1·77	1·42	1·91	2 35	2 38	1·29	1·82
September ...	6·317	6·519	7·07	6·04	6·43	5·72	6·24	6·62	7.06	5 65	5·19
October	3·192	3·247	3·04	3·06	3·40	3·37	2·85	2·56	2 83	2·97	3·31
November ...	1·034	0·931	0·75	0·28 (?)	0·95	0·62	0·68	0·74	0 74	0 83	0·81
December ...	1·545	1·190	1·92	1·55	1·53	1·58	2·07	1·87	3·21	1·62	1·57
Totals.....	27·738	28·429	29·10	26·05	29·14	27·76	28·47	29·41	33 47	25·42	27 24

NOTE.—Hereford at Richmond-place is 182 feet above sea-level. Fownhope is 5 miles 3½ furlongs S.E. of Hereford; its height above sea-level has not been determined, but it is lower than Hereford. Tupsley is 1½ mile E. of Hereford, and about 232 feet above the Sea. Stretton is 3 miles 1 furlong W.N.W. of Hereford, and 20 or 30 feet higher. West Lodge, Leominster, is about 12 miles N. of Hereford, and 264 feet above the Sea. Sellack Vicarage is 8¼ miles S.S.E. of Hereford, and about 240 feet above the Sea. Archenfield, Ross, is 11¼ miles S.E. by S of Hereford, and 280 feet above sea-level. Rocklands is 14 miles S.S.E. of Hereford, and, at least, 100 feet above the sea. Hagley Park is 3 miles E. by N. of Hereford; height above sea-level not yet determined.

EDWIN J. ISBELL.
WILLIAM COOKE.

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REMARKS ON THE FLOOD WATER OF THE WYE, 1871.

By JOHN LLOYD, Esq.

The Chancellor of the Exchequer remarked, in a recent speech, that we were all in the habit of looking with pleasure at a running brook or river, but seldom cared to estimate the quantity of water flowing by. How would the river Pactolus with its golden sand fare, if within reach of the Treasury? It would soon figure in the estimate of revenue for the current year. We are prosaic enough to gauge and register the contents of the once sylvan and pure Wye, and in recording the result offer an apology to the shade of its presiding nymph, Vaga. I say the "shade" advisedly, as the nymph herself has long ago been poisoned by the sewage refuse of the highly-civilised citizens of the enterprising city of Hereford. River gods and goddesses and water nymphs all died of typhoid fever in the year 1847 or thereabouts, when the Towns Improvement Act became generally enforced.

In these days, when everything is measured and weighed, the habit grows upon us, until we apply it to rainfalls, and their necessary sequence, the flood water of our rivers. From the very simple tables kept at Hereford it is easy to calculate now, or at any future time, the number of cubic feet of water passing down the Wye on any and every day of the year. At 1 foot high 177,000 cubic feet pass per minute, and so on up to 10 feet, when the total is 766,000 cubic feet. A flood over 10 feet high spreads above the banks, and cannot be accurately gauged.

The past year was remarkable for the evenness of its character, and formed a pleasing contrast to the two preceding ones, in which, while deluged in the winter months, the country was for want of rain burnt up in summer. On the one hand there was not a single high flood; on the other there was no long continuance of low water. The flood register shows that no unusual amount of water flowed down the Wye, and the rain register similarly testifies to only the normal rainfall. Rain fell every month in moderate quantities, and this even character of the year, while favourable to the green crops (such a year for roots has seldom been known), proved above an average one in the fresh-water fisheries of the Wye. In 1870, on the Fownhope fishery, only 20 salmon were taken in the nets; in 1871, 186. In the April flood, 18th to 21st, there was a remarkable run of fine fish up the river; 44 salmon were taken at Fownhope on those days, of the gross weight of 710 lbs., or averaging 16 lbs. each. The largest fish weighed 46 lbs. Though a fair number of salmon found their way safely to the "catches" in the upper waters, the angling was indifferent, as fish would not rise freely to

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the fly. By some this circumstance was attributed to the "maund," or peaty stain in the water, by others to the heavy lurid atmosphere which prevailed. The same circumstance was noticed on the Shannon, and the year was there called "Cummer's year," after an Irishman, who prophesied the advent of a year when "there should be plenty of fish, but de'il a one would rise." May and November were the only really dry months in the past year, and it seemed that we had at length broken through the rule which prevailed in previous years, fo alternate long spells of wet and dry weather.

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Register of Height of River in the Year 1871; taken daily at Hereford Bridge at 9 a.m. The datum point is the summer level of the river.

1871.	No. of days wet or stormy.	No. of days dry.	Height of river above Summer level.	Average height each day.	No. of days of low water.	RAINFALL. Hereford.	Rhayader.	Llanwrtyd.	Llandrindod.	OBSERVATIONS.
			Ft. In.	Ft. In.		Inches	Inches	Inches	Inches	
January	9	22	49 10	1 7	11	2·677	5·38	5·67		Height of river on 14th, 10ft.
February	10	18	83 1	2 10	1		3·84	4·59		Height on the 15th, 7 ft. [month.
March	6	25	74 10	2 5	6	1·311	2·96	3·09		Height on the 19th, 8ft. A wonderful run of salmon this
April	4	26	49 4	1 8	17	1·113	6·21	6·01		A dry month. [month dry.
May	1	30	15 7	0 6	24	2·099	0·84	1·00		Height of river on the 3rd, 7 ft. Latter part of the
June	10	20	50 2	1 8	9	0·997	2·93	2·90		Height of river on the 3rd, 7ft. Latter part of the
July	4	27	31 8	1 0	20	2·896	6·45	7·72		month dry.
August	7	24	71 8	2 4	17	2·996	3·56	3·39	No Register kept this year.	Height of river on the 3rd, 11ft. 8in., and on the 30th,
September	6	24	96 10	3 2	11	1·561	5·84	6·02		8ft. Middle of this month dry.
October	5	26	58 2	1 11	10	6·317	8·06	6·77		Height of river on the 5th, 22ft. 6in. Highest flood of the year. Heavy water this month.
November	1	29	12 11	0 5	22	3·192	1·90	1·54		River full the commencement of this month. Dry weather set in on the 22nd.
December	10	21	81 4	2 7	9	1·034	4·71	3·74		Unusually dry month.
						1·545				A good deal of rain fell the latter end of this month. River 8ft high on the 25th.
Totals, 1871	73	292	675 5	22 1	157	27·738	52·68	52·44		
Total, 1868	86	280	704 8	22 11	129	28·531				
Total, 1869	107	258	940 9	31 1	79	30.96	55·14	39·59*	26·51*	
Total, 1870	75	291	665 1	20 5	162	18·631	40·30	47·59	27·14	

* Total for eight months only.

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REPORT OF THE COMMITTEE WITH REFERENCE TO THE ESTABLISHMENT OF A FREE LIBRARY AND MUSEUM AT HEREFORD.

GENTLEMEN OF THE WOOLHOPE CLUB,

Your Committee appointed last year to act with the Committee of the Town Council with a view to carry out the scheme of a Free Library Museum for the City of Hereford have now the honour of laying their report before you.

At their first meeting on the 11th of March the whole scheme was duly explained and discussed, and it was resolved to obtain a site suitable for the purpose, and the Town Council were asked to take the necessary steps, to call a public meeting of the inhabitants in order to obtain a vote of approval of the scheme so that the "Public Libraries Museum Act" might be put in force.

The Sub-Committee appointed to inspect the various sites which were offered carefully visited and inspected ten different sites, and after much discussion it was at length determined that the property in Broad-street, adjoining Canon Musgrave's residence and nearly opposite to the Post-office, was the most eligible.

That site was accordingly purchased.

On the 31st July the public meeting was held and the citizens of Hereford approved of the scheme and determined unanimously to adopt the "Free Libraries Museum Act."

At the next meeting of the Joint Committee, after learning the result of the public meeting, it was resolved that a Sub-Committee, consisting of the Mayor of Hereford, Mr. J. F. Symonds, Mr. J. Rankin, Mr. T. Cam, and Dr. Bull, should be appointed to take into consideration the best mode of carrying out the scheme, and that the same Committee, with the addition of the Rev. H. Cooper Key, be appointed for the purpose of preparing the necessary plans for the new building.

On the 2nd of September the Sub-Committee reported to the Joint Committee, and the result was that a report was agreed upon to be sent up to the Town Council asking them to put the "Free Libraries Museum Act" in force and to appoint a Committee of Management, and to open the Institution as soon as possible in temporary premises.

This report was agreed to at the next meeting of the Town Council, and a Committee of Management was appointed, into whose hands all further details for the carrying out of the scheme were placed, and so ended the labours of the Joint Committee.

Your Committee cannot close this report without referring to the fact that the Free Library has been opened, and although the premises are confined and inconvenient, yet the attendance has been considerably beyond expectation, and your

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Committee would also take this, their last official opportunity of addressing you, to point out that the success or otherwise of the Museum must, to a great extent, depend upon the spontaneous labours of this Society, and they would urge upon every member that he should do all he can in the meantime to provide specimens of the various branches of Natural History so that the Museum when it is opened may be a credit and not a disgrace to the scientific men of this county.

(Signed) REV. SIR GEORGE CORNEWALL, BART.
REV. H. COOPER KEY.
REV. C. J. ROBINSON.
REV. JAMES DAVIES.
ARTHUR ARMITAGE, ESQ.
THOMAS CAM.
DR. BULL.
DR. CHAPMAN.
JAMES RANKIN, ESQ.
DR. MCCULLOUGH.

Hereford, Feb. 24th, 1872.

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A SUPPLEMENTARY NOTE ON THE BONES DISCOVERED IN MAKING THE SECTIONS OF THE ISLAND OF LLANGORSE.

By HENRY DUMBLETON, Esq.

The sections made to show the stratum of the Island on Llangorse Lake, or Llyn Savathan, proved clearly its artificial origin. Several holes were sunk in different parts of the Island, and in one of these, at the north-east angle of the Island, bones were found very plentifully at all depths above the peat. Some of these bones were sent to Professor Rolleston, of Oxford, who recognised amongst them bones of a small and large horse, and bones of small species of the hog, the sheep, and the ox. Another set of the bones found were exhibited, you may remember, at the British Association at Exeter, in 1869, and amongst them Mr. Boyd Dawkins recognised those of the red deer, wild boar, and *Bos longifrons*. Mr. Dawkins was of opinion that the group altogether from the greater proportion of wild than domestic animals, indicated a remote period of deposition. These conclusions were stated in the papers, I had the honour to read it before the Club at Llangorse, but since this time Professor Owen has been kind enough to examine a series of the bones found there, and in a letter dated December 4th 1871, he states,—

"There are the remains of the hog, and those of the Bos agree best, with *Bos longifrons*. The recent date of the collection would be no bar to that species having contributed to the food of the lake dwellers. Since the period when evidence was given of the probability of the Welsh Runts as well as the Highland Kyloes, being domesticated descendants of that small aboriginal British Bovine (*History of British Fossil Mammals*, 8 vo., 1864, p. 509), corroborative evidence has been obtained, and Mr. Boyd Dawkins communicates in the last number of the *Proceedings of the Manchester Philosophical Society*, his conviction of the same derivation of our small short-horned mountain cattle. Amongst the detached teeth I have detected the lower molar of a small ass, or an equine of that size."

These several reports confirm each other, and doubtless correctly represent the character of the bones found. The fact, however, of the domestication of the *Bos longifrons* having been admitted, renders very uncertain the age of the deposit at the Island of Llangorse Lake.

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A DESCRIPTION OF SOME SPECIES OF THE GENUS ASCOBOLUS NEW TO ENGLAND.

By JAMES RENNY, Esq.

ASCOBOLUS (RYPAROBIUS), ARGENTEUS, AND
ASCOBOLUS (RYPAROBIUS), WOOLHOPENSIS.

I am convinced that the district of the Woolhope Club abounds in new mycetal growths awaiting a discoverer, and the labours of the patient and zealous student who will search for them will not miss an abundant reward. Among the several hundred species which I have collected during the past few weeks, within five or six miles of Hereford, I have had the good luck to stumble upon forms unknown before in Great Britain, in such proportion as amply to bear out this view, and I have thought it might not be uninteresting to the Club to hear a description of two or three species the Genus Ascobolus which I have met with lately in Herefordshire. These are the first specimensof a type not hitherto seen out of France. It is characterised by the possession of reproductive organs which contain numerous spores, in place of the almost universally prevalent number of eight. Five years ago M. Boudier wrote for the *Annales des Sciences Naturelles* an elegant monogram of this Genus Ascobolus. He divided it into several groups, one of which he called Ryparobius—the filth-dweller—and he described it as possessing the peculiarity of spore vessels holding numerous spores, and for the first time he gave distinct names to five species. It is true that another of his sections contains a species, *sexdecemspores*, which is known in this country, as you will see in Mr. Cooke's handbook, but the many spored (that is 64 or 128 spored) Ryparobii have not been before described as of English growth.

I need not presume that the large and beautiful genus *Peziza* is unknown to any here. No one who takes up one of the bolder and finer species, Badia or Aurantia, for instance, and witnesses for the first time the little puffs of cloudy dust it emits at short intervals, will fail to be struck by the phenomenon. The upper and outer surface of the plant consists of a thick layer of elongated, somewhat tubular cells, arranged side by side lengthways, and closed below. Each cell or ascus as a rounded membranous top, which alone shuts off from the atmosphere the eight spores it is its function to elaborate. These asci ripen their contents only in succession, so that there are always quantities of sporidia in all stages of development. The younger and still swelling asci overcome (perhaps in periodical fits of excitement, perhaps through changes of hygrometric condition, perhaps by the help of a sudden jerk along with their increasing tension), the rigid arches of the dry and now partially empty asci, with which they are intermixed. The walls of these riper asci, in their collapse, force out the minute

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sporidia with which they are charged, through the ruptured cup, in so many tiny jets as to form a perfectly visible dust-cloud.

The Genus Peziza is so numerously endowed with species, that, for the purpose of systematic arrangement, it is desirable to shut off from it all allied growths which have any constant peculiarity of form or function. Ascobolus, the Ascus-flinger, is a Peziza which ejects its spore-cases along with the spores they hold. This, and the fact that the ascus is usually broader and less tubular, constitute the only differences between it and Peziza, which retains to the last the effete ascus wall. I now present to you the plants, and drawings and descriptions of the two species I wish more especially to bring to your knowledge. They have been laid before Mr. Berkeley and Mr. Broome, who have decided that they are novel species, an opinion with which I am quite satisfied to agree, and they will be included in the century of new forms which these gentlemen are about to publish in the *Annals of Natural History*. To the one species they have given the specific name of *Argenteus*, from the extreme brilliancy of its silvery whiteness; and to the other, which is not less beautiful, they have appended at my request the name of *Woolhopensis*, in memory of the Club, which more than any other, cultivates mycological science.

Ascobolus argenteus (section Ryparobius), occurs, scattered or single, and is very minute, subsessile, or attached by a very small foot; at first of a pure hyaline silvery white; finally, when empty, pallid and sodden, or brownish. When young its form is sub-globular, externally granular, surmounted by a fringe of long hairs; then it becomes hemispherical, sub-granular to smooth on the outside the marginal edge supporting a close row of long, nearly even, upright hairs. The disc is black, but marked by the projecting ends of the more ripe asci. The asci are broad, being widest towards their upper end, which is formed by a sub-conical cap, which springs from a visible but transparent ring, and they gradually narrow below, with flexture, to a tubular base. The sporidia are numerous (64 normally), shuttle-shaped, smooth, colourless, of uniform substance. The plant is found upon rabbits' dung. The cups for the most part are attached to filaments of mucor caninus which may be covering the pellets of the dung. Probably, however, they have only been elevated thus by the growth or shrinking of the mucor threads away from their orginal matrix. The row of hairs which fringes the margin is rarely doubled, or only in part. They measure on the average ·0025 in height by ·00025 in thickness, and form quite one-third the height of the plant, but become evanescent with age. They are stiff, very regular, thickish, blunt-ended, and unseptate. The ring, which is readily perceived in the ascus, is formed by a thickening which is semicircular in section applied to the inner surface of the wall, and doubtless stiffens it much. The pinch of the growing asci upon the ripened vessel which now projects above the surface of the disc to just the level of this ring or a little below it, is thus counteracted, and the

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ascus, gradually narrowing downwards from this line, is easily forced out by the increasing nip applied to the thinner part of the wedge. Dehiscence for the escape of spores occurs normally across the tip, in a plane perpendicular to the ring, and extends nearly or quite down to it, so as to form a pair of lips, seemingly never taking place along its line or in a parallel plane. This method of opening forms a marked difference to the plan observed in another section of the Genus, where a special lid opens or parts for the rejection of the spores. The spores measure ·0006 @ ·0007 × ·00025 @ ·00030. They are shaped somewhat like melon seeds, and are all of very regular contour. They have never been found to exceed 64 in each ascus, and, so well as they can be counted, usually approach this number closely. They occupy throughout their whole period of development, after a first early time, the whole interior of the ascus.

Ascobolus Woolhopensis (section Ryparobius), occurs scattered or singly. It is very minute, and of a pure silvery whiteness, but at length it becomes dingy and sodden in tint. The cups are from the first elevated on a thick unshapely stem, exhibiting in section nearly the frustrum of a cone (sometimes, however sub-cylindrical), studded with large semi-globular granules; the cup portion being covered thinly with somewhat stout hairs which surmount the margin. Older plants expand in all directions, but the cups most, so as to spread somewhat beyond the line of the broad unsymmetrical stem, the granular coating of which has grown into semi-orbicular nodules, mainly of considerable size, but ever hyaline and translucent. The hairs on the cup form a raised fringe to the margin of the disc, and cover, but not so markedly, the lower portion as in the younger plant. The Asci and Sporidia are very similar to those of Argenteus, but from an early period the spores form a close oval cluster in the upper part of the Ascus.

Ascobolus Woolhopensis has been found upon birds' dung mixed with filaments of mucor, and is usually lifted up by them.

The stem is formed internally as well as externally of spherical cells, which are largest below. In smaller specimens viewed under the microscope the cup is quite transparent, and the Asci are readily seen in their position of growth. There breadth and size necessarily limit their number in a plant so small, and they may be counted with greater certainty than attends the counting of the spores, contrasting thus with the innumerable number in Peziza, or the commoner species of the Genus Turfuraceus, or Glaber, *e.g.* The position and appearance of the ring is the same as in A. argenteus. The hairs are similar to those of Argenteus, but less regular, and not more than half as long above the edge of the cup, and extend in several tiers below.

Both these plants have been so frequently met with bearing the described characters, as to warrant the belief that they may be considered permanent forms, having sufficiently well marked distinctions to constitute separate species; but

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there seem to be several varieties somewhat differing from either of the two, and more or less intermediate between them.

A third species, characterised mainly by an Ascus with 128 spores, or with a still higher number, was met with by me at the same time, but it was crushed under the microscope before I was aware of its presence, so that I only saw the asci crowded with its almost uncountable spores. Mr. Broome thinks this is probably the same with M. Boudier's *Ascobolus dubius*, a species he thinks he found near Bath. I will not trouble you with the characters of this species, because they may yet be found under more favourable circumstances.

Gentlemen of the Woolhope Club, botanists have no prejudices, and in truth few objects are more charming when duly magnified than these minute plants. Though their birthplace be repulsive they suffer not one tinge of corruption, their brilliancy shines quite unsullied even on their native filth, and like Marina in the stews, they wear a halo of purity in the vilest dwelling-place.

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OFFICERS FOR THE YEAR

1872.

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J. GRIFFITH MORRIS, ESQ., Hereford.
JAMES RANKIN, ESQ., M.A., Bryngwyn, Hereford.
The REV. T. THISTLETHWAITE SMITH, Thruxton, Hereford.

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JOHN LLOYD, ESQ., Huntington Court, Hereford.
C. G. MARTIN, ESQ., Hereford.

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The REV. G. H. CORNEWALL, BART., Moccas Court, Hereford.

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MR. ARTHUR THOMPSON, St. Nicholas Street, Hereford.

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WOOLHOPE NATURALISTS' FIELD CLUB,

STATEMENT OF ACCOUNTS for the YEAR ENDING DECEMBER 31st, 1871.

Dr.	£	s.	d.
To Subscriptions received for 1871	57	10	0
,, Entrance Fees received from five new Members ...	2	10	0
,, Arrears of Subscriptions received for 1870	15	0	0
,, Arrears of Entrance Fees received for 1870	4	0	0
,, Cash received for spare copies of Transactions ...	2	12	6
,, Cash received for Illustrations	7	11	6
,, Balance due to Treasurer	26	3	5
	£115	7	5

Cr.	£	s.	d.
By Balance due to Treasurer December 31, 1870 ...	2	6	7
,, Reports of Copies of Meetings, &c. ("Hereford Times")	45	9	6
,, Circulars, Mounts, Stationery, Stamps, &c.	11	9	11
,, Binding of Transactions and Carriage	13	0	0
,, E. Palmer and Son (Lithographs)	17	1	10
,, Ladmore and Son (Photographs)	14	7	1
,, Woodward (Woodcuts)	0	15	0
,, Repairs of Barometer	0	12	6
,, Purchase of Transactions	2	10	0
,, Excavations at Cusop	2	0	0
,, Assistant Secretary for 1870	5	0	0
,, Assistant Secretary (Postage Stamps)	0	15	0
	£115	7	5

Examined and found correct.

THOMAS CAM, President.
ARTHUR THOMPSON, Treasurer.

Hereford, February 21st, 1872.

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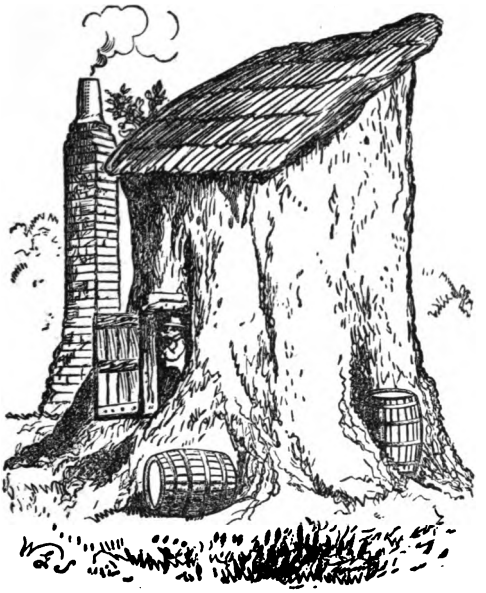
THE REMARKABLE TREES

OF

HEREFORDSHIRE.



"EVE" AT MORETON STATION, 1870.

(Quercus pedunculata.)

"Adam" and "Eve" were the names given to two massive Oak trees which stood in the Lugg meadows, near Moreton, Herefordshire. "Adam" was blown down about 35 years ago, and by the same storm "Eve" lost its top and remaining branches. When the Shrewsbury and Hereford Railway was made, "Eve" was included in the line, and the hollow bole was at once appropriated as a residence by an economical navvy. For many months after the line was opened for public traffic, it actually formed the residence and office of the Station Master, all complete in itself. It then became the lamp room, and was used for this purpose for about 14 years, until 1869, since which time it has been converted into a stable for a donkey. The bole was alive in 1868, when it put forth a few green twigs on the south side. It is now quite dead, but in its dried state it still measures 25 feet 8 inches in circumference. "Eve's" spacious cavity has long been well known; 21 full grown sheep have been counted as they came out from it; a party of 13 are said to have drank tea within it, and from reliable accounts it has been the scene occasionally of much picnickian fun. *(See Transactions for* 1870, *p.* 289.*)*

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ADDRESS OF THE RETIRING PRESIDENT,

(ELMES Y. STEELE, ESQ.)

READ AT

THE ANNUAL MEETING, THURSDAY, OCTOBER 10TH, 1872.

GENTLEMEN OF THE WOOLHOPE CLUB—By the rules of our Association, the President is required to deliver an address at the Annual Meeting, on the proceedings of the year, together with such observations as he may deem conducive to the welfare of the Club and to the promotion of its objects. This places me in the somewhat difficult and unenviable position of having to construct a discourse out of unusally scanty materials, for the year just passed has not been signalized by any of those remarkable discoveries which heretofore have generally rewarded our search in the wide field of Geology and of Natural History. The annual pudding must perforce be served without plums, and I must, therefore, trust to your forbearance and resignation in asking you to sit patiently over a réchauffé of common doings—a mere omelette soufflée instead of the generous and substantial compound more suitable to your national taste and vigorous digestion. The seasons, too, have materially interfered with our field operations. At one time rude Boreas has chilled our energies, congealing the marrow of the sciences within us at another drenching rain, despite our cries of "Jam satis!" have marred the hoped for results of our most undaunted efforts. Time, too, who ever flies fastest when we most desire that he would linger, has, more than once, been sadly against us, for the advantages due to railroads in bringing us together from distant points to the trysting place, are often more than counterbalanced by the early hastening home demanded, by the inexorable whistle; despite all these drawbacks, it is some satisfaction to me that none of the excursions undertaken during the term, when by your indulgence I have for the second time been honoured with the Presidency of the Woolhope Club, have been absolute failures. If no valuable discoveries have rewarded our Geological explorations, if no Botanical trophies have been carried off from the field of our excursions, we have mustered fairly-

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well to the roll call and enjoyed the pleasant flow of social intercourse, the mutual interchange of thought on subjects congenial to our minds, which are by no means the least valuable, or soonest forgotten amongst the results of such an association as ours.

Et nos meminisse juvabit.

Our first field meeting was appointed for Great Malvern on the 17th of May, in conjunction with the Malvern Field Club and the Bath Natural History Society. At the Belle Vue Hotel, a goodly muster of Woolhopeans assembled, but, alas! no sunny smiles gave us welcome, for a north-easter was blowing about our ears, and the landscape was shrouded in misty vapor, holding out a cheerless prospect to those of us who hoped to see something of the far-famed view from the summit of the Worcestershire Beacon. May, more than usually coy, was shivering in a wintry garb. The atmospheric gloom was however counterbalanced by the cordial greeting of our Malvern friends, amongst whom we recognised many of our old comrades of the field in days gone by. At their head were the Rev. W. Symonds, facile princeps in the Geology of the district, late President; Mr. Lees, the Veteran Naturalist of Worcestershire, actual President; and the Rev. Reginald Hill, Honorary Secretary of the Malvern Field Club. To the courtesy of Mr. Lees I am indebted for the assistance afforded me in preparing my account of this meeting, by his able report of the proceedings of the day, couched in his usual style, a happy combination of the florid with the substantial. I shall not venture to embellish my more humble recital with any feathers of ornament borrowed from his lustrous plumage, but, for the sterner facts I shall strictly adhere to his narrative as my safest guide when treading ground with which he is far more familiar than I can possibly be. The Bath Naturalist Society was represented by Colonel St. Aubin; Lieutenant-Colonel Younghusband, Major Chandler, Messrs. H. Holland Burne, and W. Allen, whose arrival from the distant springs of Aquæ Solis, known to Imperial Rome nearly 2,000 years since, on a visit to the Nineteenth Century Waters of Malvern, was greeted with a cordial brotherly welcome. After transacting the formal business of our Club—mainly consisting in the proposal and election of new members—we joined the Bath and Malvern Naturalists for the start, under the guidance of our leaders, Mr. Symonds, Mr. Lees, and Mr. Hill, and sallied forth in a long string of coaches and flys to North Malvern, the first point laid down in the programme. Here, taking advantage of the massive display of the characteristic chrystalline rocks of the Malvern range, Mr. Symonds gave us, with his wonted eloquence, an able account of the present state of knowledge as to the composition of that remarkable protrusion of the earth's surface, till recent times supposed to consist almost entirely of sienite, but nowsatisfactorily determined to be one of the oldest formations of sedimentary rocks, probably the most ancient in the world, corresponding with the Laurentian rocks of Canada and synchronous with the gneiss of Sutherlandshire, the rocks having been, since their original deposition, metamorphosed by sienite and by the intrusion of trap dykes, and upheaved at different times in the lapse of ages. At a favourable spot the remarkable striations, called *slickensides*, were pointed out. These, formerly attributed to the trituration of ice in masses, were proved to be due to the grinding of the rocks one against another, under the impulse of upheaving forces. The last upward movement of the hills was shown by the red sandstone, of Permian age, exhibited at several points, folded back on the eastern flank of the hills, and this feature was formerly well displayed at the base of the rocks near this very locality, but the ground being covered with debris, the junction is now concealed. The party then moved on to where, by the roadside at the base of the end hill, there is a very instructive exhibition of intrusive trap with numerous joints that curiously simulate basaltic columns, and on which Mr. Symonds made some explanatory remarks, intimating that the intrusion of trap dykes at various

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times and places among the chrystalline rocks of the hills, had caused numerous variations of mineralogical character throughout the chain. Mr. E. Lees said that near this spot was a greater amount of sulphate of Barytes than at any other part of the hills; looking about among the broken-up debris here, as directed by him, some fine crystallizations were found. Mr. Hill led a few of the party, eurious in mechanical operations, to see a stone-breaking machine in work at a quarry. We then hastened on to the Sienitic Bosses in Cowleigh Park, and mounted those ancient isolated rocks, which are an extension of the Malvern Chain in this direction. From this point a picturesque scenery is unfolded, and, under a more propitious sky, its varied beauties would have been more fully appreciated than they could be under the leaden clouds which utterly concealed from view the prominent features of the landscape. We next proceeded to Whitman's Hill, where, in an extensive quarry, a fine section of Wenlock limestone, the beds of which dip westward, is exposed. None but common fossils were found, but Mr. Symonds gave us in few but choice terms an outline of the Geology of the surrounding country, more particularly tracing the succession of formations in a south-westerly direction from this spot, near the northern end of the Malvern Range, to the edge of the South Wales coalfield, pointing out the physical structure of the intervening district, Aymestrey rock, Ludlow shales, old red sandstone, Carboniferous limestone, and mill-stone grit, but, alas! the land marks were visible to the mental eye only. Thanks were given to Mr. Symonds for his able address, at the close of which we were led off under the guidance of Mr. Hill, who ably piloted us through brushwood and bramble, through briar and mud, to the Croft Limestone Quarries. These have been worked out, and after glancing at the varied scenery presented by the undulations of the surface, occasioned by the succession of Silurian ridges, and gathering some of the less common plants of the month, amongst which I may name *Anthyllis vulneraria*, *Polygala vulgaris*, *Rosa villosa*, *Onobrychis sativa*, *Habenaria bifolia*, *Orchis pyramidis*, and *Bromus erectus*, we reached the base of the Worcestershire Beacon. Here, at the proper spot, a search in vain was made for Miss Phillips's Conglomerate—so called from having been first discovered by the sister of the celebrated Professor Phillips, of Oxford, and interesting as being a compounded mass of Llandovery rocks and Sienite, the shells of the Llandovery beds being mixed up with quartz and felspar, thus proving by their intimate combination without trace of fusion, that when the last uplift of the Malvern Chain took place, the crystalline rocks were cold and consolidated.

We regained our carriages and drove to the Wych, where, again dismounting, some of us descended the steep declivity towards Colwall, passing in our way over an outcrop of the Woolhope limestone, where numerous corals are apparent along the bank, and attainable with very little difficulty. A short distance below is the "Old Winnings" quarry of Wenlock limestone, now inclosed within the grounds of Mr. Stephen Ballard, a member of the Malvern Club, who has made a path through the quarry, and taken advantage of the broken line of surface, by tastefully ornamenting it with rock plants and trailing shrubs, to create out of waste ground an oasis of beauty; here, under the guidance of that gentleman, we lingered enjoying the picturesque spot till time was called. Mr. Ballard's pressing hospitality was irresistible to some of his visitors, who were induced to linger still longer over a feast provided by him, which, not being in the programme of the day, the Woolhopeans, for the most part obedient to the call of their President, gratefully declined, and re-entering their carriages at the Wych, made their way to the Belle Vue, all attempt at a climb over the Worcestershire Beacon having been rendered hopeless by the murky state of the atmosphere. At the dinner your President was called upon to take the seat of honour in graceful acknowledgment on the part of

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our old Malvern friends of the Woolhope being the senior Club represented at this joint meeting. I took advantage of the occasion to give a cordial greeting to our new friends from Bath, which was in very kind terms acknowledged by Col. St. Aubin, who expressed a wish to see the members of the Malvern and Woolhope Clubs breaking ground on the banks of the Avon, where a hearty welcome would be given to them by the Bath Naturalists. I thanked Mr. Symonds and Mr. Lees for the great benefits they had each so often conferred upon us by freely dispensing the fruits of their researches and being ever ready to lend a helping hand to the learner, and to contribute to the pleasure and success of our meetings. Mr. Symonds and Mr. Lees, each in his accustomed style and manner, responded most cordially to the deserved compliment. Then Mr. Lees read a most elaborate and well digested address on "The aims and duties of Naturalists' Clubs." This paper which has been published in the proceedings of the Malvern Club will well repay a perusal. I need hardly say to those who are acquainted with the writings of this Veteran Philosopher, that it is at once poetical and logical, brimful of thought, flavoured with a quaint originality, bespeaking a fervid imagination and a cultivated taste. At the close of Mr. Lees' address, Mr. T. E. Harman was prepared to read a paper on '*Macaria liturata* and *Coremia quadrifasciaria*,' two *Lepidoptera* new to Herefordshire, as, however, the time had arrived for the Woolhopeans to regain the station on their return homewards, this paper was taken as read. I have the kind sanction of Mr. Harman to its being printed in the next volume of our transactions. This closed a very interesting meeting which, but for the gloom cast upon us by the chilling mists of a fractious atmosphere, would have been both cheerily and profitably enjoyed.

Members and visitors of the Woolhope Club present on the Malvern Field Day:—Elmes Y. Steele, Esq., President; the Rev. J. G. Smith; the Rev. Thomas Phillips; the Rev. J. H. Jukes; the Rev. G. B. Bennett; the Rev. H. B. Marshall; the Rev. H. C. Key; Rev. R. H. Williams; Rev. F. S. Stooke; Dr. George; Mr. J. W. Lloyd; Mr. T. J. Salway; Mr. T. Curley, C.E.; Mr. C. G. Martin; Mr. W. D. Banks; Mr. John Lloyd; Mr. Hugh P. Davies; Mr. W. A. Swinburne; Mr. F E. Harman; Mr. D. Lawrence; Mr. F. W. Herbert; Mr. Arthur Thompson, Assistant Secretary and Treasurer.

Members of the Malvern Field Club present:—Edwin Lees, Esq., F.L.S., &c., President; Rev. W. S. Symonds, F.G.S., Vice-President; Rev. H. P. Hill, Honorary Secretary; Rev. A. Faber, Principal of Malvern College; Rev. F. J. Eld; Rev. C. J. Bowles; Rev. J. H. Thompson; Mr. E. G. Stone, Chambers Court; Mr. J. Empson, Ripple Hall; Dr. Weir, Hilary Hill; Mr. R. Smith; Mr. Velin Clarke; Mr. E. B. Fitton; Mr. E. R. C. Hayes; Mr. A. Brown; Mr. H. Cross; Mr. J. S. Burrows; Mr. R. J. Severn Walker; Mr. Stephen Ballard; Mr. W. H. Dawson; Mr. J. Wood; Mr. J. Mackay; Mr. Smith, junr., &c.

Our second Field Meeting was arranged for the 21st of June, at Pontypool, and a strong company of members were attracted to the scene of our operations. With accessions made during the day, our list amounted to 29 members and 14 visitors, 43 in all. Again the weather was unpropitious; escaping any heavy downpour, we suffered from occasional drizzling showers, and the striking features of the interesting valley, through which the Avon runs its turbulent course on its descent to the Usk, were sadly obscured. It had occurred to me that the choice of Pontypool for a Field Meeting gave an excellent opportunity for exhibiting to our Herefordshire friends the mineral features of a coal and iron field, and, at the same time, the machinery and processes employed in the manufacture of that most useful of metals for which is celebrated a vast tract of country, otherwise comparatively barren and unproductive, which extends from the edge of the Monmouthshire coal basin to the shores of Glamorganshire and Pembrokeshire.

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v.

As Englishmen, we must all feel an interest in that branch of industry which, perhaps, more than any other, has contributed to our national fame, furnishing us with the groundwork as it were of our wealth, our strength, and our civilization. The fact that so many thousands of our working-men with their wives and families have for many years derived and still derive their subsistence, either from above or from underground labour, over this wide tract of mountain and valley, is of itself sufficiently important; but when we add to this that colossal fortunes have here been gathered together to be dispersed again thoroughout the breadth of Her Majesty's dominions, and that whilst supplying her subjects with the metal needed for machinery of every kind, for engines, railway tracks, and numberless works of art and industry, ranging from an ironclad to a saucepan, the produce of this indispensible material has conferred a signal benefit on the world at large, we cannot fail to be impressed with a true estimate of the gigantic interests involved, and to feel that a few hours spent in inquiring into the *modus operandi* followed at such works as those of Pontypool, may be well and profitably employed. I enlisted the kind services of Mr. David Lawrence, one of our members, best acquainted with the *genius loci*, and of Dr. McCullough, whose faculty for organising a pleasure party is only equalled by his alacrity to promote the enjoyment of his friends. Together we made a preliminary survey of the ground and of the works at the Race, engaging the goodwill of Mr. Williams and Mr. Green, superintending agents, who so ably directed our movements on the day of meeting. On application to Mr. Abraham Darby, I obtained his cordial permission for a descent *en masse* upon the premises, and his instructions were given to his agents that every facility should be afforded to us for a complete view of all objects of interest in connection with the works. Besides this provision for the mental alimentation of my colleagues of this club, I had a capital *pièce de resistance* in reserve in the promised assistance of Mr. W. Adams, C.E., President of the Cardiff Club and a member of ours, to meet us at the Clarence with his invaluable collection of carboniferous fossils, plans and sections of the coal field, and, better than all, a *vivâ voce* demonstration of its more salient features. Thus forearmed I felt tolerably assured of the success of the Pontypool meeting, and my hopes were not disappointed. On starting from the Pontypool-road Junction, we passed over railway and turnpike road to dip into the valley, which we ascended for some distance on the left bank of the Avon, under the overhanging woods of the Park, guided by Mr. Lawrence, who wished to obtain the opinion of the Club on a discovery of his own. He had employed some men to expose a section of limestone conglomerate in the Old Red; this proved to be, as expected, a bed of cornstone, not differing essentially in appearance or in lithological structure with many others known to us throughout the wide expanse of the Old Red formation, extending from the Monmouthshire basin to the Malvern hills. From this point, crossing the Avon—at times a mere brook, at others a turbid mountain torrent, according to the amount of rainfall prevailing—we ascended the right bank within view of the town of Pontypool; here on a grass-covered slope we delayed for a time to contemplate the scenery, grand and smiling at the same time, high and barren mountains closing in a valley of picturesque outline, the side of the latter, opposite to where we stood, clothed with the fine timber, and carpeted with the verdure of Pontypool park. We could not help regretting that so much of the beauty of the scene should be obscured by rain clouds, made all the more mirky by the heavy smoke of burning chimney stacks, features which, indispensible though these be here, certainly lend no additional charm to the else fair face of nature. Here we transacted the formal business of the Club, which was dispatched *currente calamo*, and we lost no time in working our upward way to the lowermost quarry in Cwm-ynys-cau, where a fine section of the carboniferous limestone came into view. Beds varying in thickness from 1-ft. 6-in.,

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to 9-ft. 6-in., to an aggregate depth of 68-ft. 8-in., including the topmost bed of washed stone, 1-ft 8-in. thick. This quarry is worked to supply flux for the smelting furnaces, and also road metal, and many hands were at the time engaged with pick and powder in the getting of this useful material, indispensable to the reduction of the iron ore. Mr. Green was here waiting for us, ready to give all information on the quality, uses, and distinctive features of this limestone formation. On the spoil banks numerous specimens of encrinite were found, but other fossils were rare. Very pleasing specimens were gathered up, consisting of thousands of encrinital joints, held together by a scarcely perceptible and yet very solid cement. Onward we then ascended to the upper quarry, also consisting of a succession of beds of the same limestone, varying from 4-ft. to 20-ft., and attaining an aggregate thickness of 77-ft. 6-in. Between the lowermost bed of this upper quarry and the uppermost bed of the lower quarry, first visited, intervenes a mass of shale 120-ft. thick, giving us as the total thickness of the carboniferous limestone formation, here exposed, not less than 266-ft. Mr. Green has kindly furnished me with a detailed sketch of this interesting section for the use of the Club. At Llangattock, above Crickhowell, about 16 miles westward as we follow the edge of the basin, the thickness of limestone amounts to 520-ft. which gradually thins out from this point to Camarthen Bay, finally disappearing altogether in Pembrokeshire. At the upper quarry fossils were again diligently sought for, none however but the common sorts, principally fragmentary crinoids, were obtained. Diverging to the right in an upward direction, we were led to the bed of the brook which drains the Cwm, to inspect the millstone grit *in situ*. The torrent, formed at certain seasons by the then trifling water course, has washed away all superincumbent soil, and brought into view thick masses of this remarkably hard and almost imperishable rock, which, forming the bed on which the lowest of the coal measures rest, has received the characteristic name of "Farewell rock," from the miners who know that on reaching down to it they may bid farewell to the coal. Higher up in our ascent we came across broken masses of millstone grit, huge blocks heaped up or scattered over the surface, relicts of many a landfall and many a deluge of the past. The same tale, on a large scale of drift and denundation, is told by such blocks of millstone grit found on the surface or buried in the soil, over many miles of the valley of the Usk, spreading from the escarpment of the range down to the river bed. Leaving the millstone grit we came at once to the coal measures. As it entered not into our programme to lead a forlorn hope into the bowels of the earth, we abstained from courting coal mud and darkness in the pits below, resting satisfied with what might be learnt about them in the light of day; arriving then at the Blaendare furnaces, we saw an extensive and well-assorted assemblage of smelting furnaces with their appurtenances, locally known as the Race Works. We passed through them under the able and intelligent guidance of their superintendent, Mr. Williams, who pointed out the varying qualities of limestone broken up for flux; the coke, as made on the yard on the old fashioned but wasteful plan of carbonising the coal in ridges, skilfully built up in the open air, and allowed to burn till the gaseous components have been driven off, when the carbonaceous residue is retained by gradually smothering the fire under a covering of ashes; the coke as made by the new, less wasteful plan of carbonising in coke ovens, which, however, does not seem to yield so good a product as that obtained on the yard. We saw these coke ovens and, following our guide, we ascended to the platform at the top of the smelting furnaces. Here was a range of ovens for roasting the ores—a useful process preparatory to the smelting. The improved furnaces were exhibited, and the charges of ore, limestone, and coke were seen as they were cast into the burning in due proportions, after which huge iron lids were let down to prevent the escape of the gaseous products of combustion, which formerly was per-

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mitted. These heated gases being now collected in large iron tubes are conveyed away, to assist in heating the steam for the blast engines. After visiting the very excellent and well arranged Engine-house we proceeded to witness the tapping of the furnace which was a novel and interesting sight to many of our party. The sow and pigs were seen running into their respective sandy beds, and a general insight was obtained into the method of extracting the metal in a way that no description can convey. We were shown some fine specimens of Bessemer pigs by Mr. Williams, and we sympathised with the natural pride he seemed to take in the excellence of the grain these pigs exhibited. Adjourning to the offices, we had before us plans and sections of the workings, ores, and other materials in great variety, all most kindly and ably explained by our obliging *amicus curiæ*, and then turning our faces towards Pontypool, we descended a picturesque gorge, passing the ponds in our way, and under Mr. Lawrence's guidance inspecting a fine coal measure section, till we reached the Clarence Hotel, where, in a large and commodious room, our dinner table was spread. Here, true to his kind promise, was our friend Mr. Adams; his splendid selection of fossils was displayed on side-tables, and beautiful maps and sections of the coal and iron field adorned the walls. After dinner he gave us a *vivâ voce* description of all that is most interesting in connection with the subject, and every gentleman present evinced how much we felt indebted to our excellent friend for the trouble he had taken to contribute to the success of the day, and for the clear and comprehensive information he had imparted. I need not further dwell on these particulars, for Mr. Adams has kindly promised me a paper for this meeting which will prove, I doubt not, a most valuable appendix to the proceedings of our very successful meeting at Pontypool.

List of Members and Visitors present at the Pontypool Field Meeting:—Members: Elmes Y. Steele, Esq., President; James Rankin, Esq., J. Griffith Morris, Esq., Vice-Presidents; W. Adams, Esq., C.E., President of the Cardiff Club; Timothy Curley, Esq., C. G. Martin, Esq., Central Committee; H. G. Apperley, Esq.; Arthur Armitage, Esq.; Dr. Bull; Thomas Cam, Esq.; the Rev. E. Du Buisson, the Rev. W. C. Fowle; W. C. Gibson, Esq.; E. S. Hutchinson, Esq.; Mr. F. E. Harman; F. W. Herbert, Esq.; E. T. Husbands, Esq.; the Rev. J. Rees Jenkins; the Rev. H. Cooper Key; Mr. James W. Lloyd; David Lawrence, Esq.; the Rev. C. J. Robinson; Lilburn Rosher, Esq.; R. Vassar Smith, Esq.; W. A. Swinburne, Esq.; J. F. Symonds, Esq.; the Rev. C. J. Westropp; the Rev. R. H. Williams; Mr. Arthur Thompson, Treasurer and Assistant Secretary.

Visitors:—Colonel Byrde; — McCarthy, Esq.; A. C. Crutwell, Esq.; the Rev. E. Cunningham; T. Clifton Paris, Esq.; A. E. Riddle, Esq.; the Rev. R. Willis; Alexander Edwards, Esq.; Dr. Williams; Dr. Davies; Mr. J. T. Bowen; Mr. Williams, Mr. Green, Race Works.

The third Field Meeting, being "the Ladies' Day," was appointed for the 19th of July, to be held on the hill above the village of Bredwardine, known as Meerbach Point or Arthur's Stone Mountain. At this, to my great regret, I was totally unable to be present, I most keenly felt to my cost the tyranny of what our French friends call *la force majeure*. From childhood upwards a devoted admirer and willing servant of the fair sex, I inwardly ackowledged a special call to do all knightly honour and service in the name of the Woolhope Club to the ladies who might favour our expedition with their presence, and I fear that my apology for enforced absence, if it was conveyed to them as I begged it might be, must have left them still under the impression that the President for the year was a recreant unworthy of his spurs. I suffered much disappointment also from being, through the same cause, compelled to decline a most kind and courteous invitation from our Hono-

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rary Secretary, the Rev. Sir George Cornewall, and from Lady Cornewall, to spend an evening at Moccas Court in anticipation of the Field Day. Of the proceedings on the 19th of July, not having taken part in them, I can say nothing, but I have heard that they passed off right merrily, and I hope some friend amongst our associates who had the pleasure that the fates denied me, will supplement my omission by giving us a report upon them.

Members and Visitors present at the Bredwardine Meeting:—The Rev. Sir G. H. Cornewall, Lady Cornewall, Miss Cornewall, Mr. Curley, Mr. John Lloyd, Mr. Herbert, and Mrs. Wood, the Rev. C. E. Underwood and Mrs. Underwood (Madley), Mr. Mrs. and Miss Giles (Byford), Mr. and Mrs. Thomas Swinburne, Mr. and Mrs. W. A. Swinburne (Dulas), Miss Bowen (Hay), Miss Hammond, the Rev. James Davies (Moor Court), Miss Mary Davies, Miss M. Cleasy, Mr. J. H. Davies, Mr. H. P. Davies, the Rev. Thomas Woodhouse, Mr. and Mrs. E. Colt Williams, the Rev. C. J. M. and Mrs. Metcalf, the Rev. J. and Mrs. Houseman, the Rev. J. E. Grasett, Miss Matthews, Mr. J. E. Smith and Miss Smith (Hay), Mr. Flavell Edmunds, Mr. and Miss Emson, the Rev. C. J. and Mrs. Robinson, the Rev. Jos. and Mrs. Hill, Mrs. French, Miss Newton, Miss Gibson, Mr. Wm. C. Gibson, Mr. James C. Cameron, Mrs. Kendall, Miss Saunders, Mr. McCarthy, the Rev. T. and Mrs. Phillips (Dewsall), the Rev. H. B. and Mrs. Marshall, the Rev. R. Bishop, the Rev. C. F. S. Stooke, Col. and Mrs. Byrde, Mr. Harmer, Mr. J. F. and Misses Symonds (2), Miss Garrett, Miss Teare, Misses Bedford (2), Mr. Arthur and Miss C. Thompson, Major Williams, Mr. Henry Hall, and Miss Bulton.

An extraordinary Field Meeting was got up for the 29th of July, the place appointed being Cornet's Bridge, in the parish of Bodenham, the object to examine the great devastation caused by the tornado or whirlwind of the 7th of that month, under the guidance of two members of the Club who had visited the scene. The departure took place from the Green Dragon, at 10 o'clock. and fully bent as I was upon putting in an appearance, more pressing engagements prevented my getting off by the first train, and when I did leave Abergavenny, I had the mortification to be detained for two hours on the railway in a severe thunderstorm, whilst the obstructions to the traffic caused by the terrible accident at the Red Hill Junction were in course of removal. When the line was cleared, I only reached the Green Dragon in time to find the excursionists well on with the second course of their dinner, after which I received from them an account of the expedition. The scene was for our latitude a most strange and unaccustomed sight, the more striking features of which I cannot better portray than by borrowing the delineation which appeared in the 5th page of the *Hereford Times* of July 13th:

"The little parish of Felton, situated about 8 miles midway between Hereford and "Bromyard, was on Sunday last visited by one of the most remarkable thunderstorms and "hurricanes of wind, attended with the most direful consequences as far as destruction of "property is concerned, that has ever happened within the memory of the oldest inhabi- "tant of that parish. Many of the owners of houses and land have suffered considerable "losses; trees of enormous height and girth were uprooted and hurled in all directions, "others were twisted round and torn off from the centre, and large branches were carried "away into adjoining fields. Some of the houses were unroofed, others were partially "blown down, scarcely leaving a rack behind, whilst in several labourers' cottages the "windows were blown out, the inmates having, however, fortunately in every case escaped "unhurt, not a single accident having occurred to endanger the life of any person. The "grain was in many fields beaten down to the ground from the force of the wind and rain, and "the hop yards too were played sad havoc with by the frolics of the wind, the poles having "been lifted out of the ground and the bines broken to pieces. One extraordinary

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"fact is worthy of notice in connection with this remarkable storm, showing the partiality "of the destructive element. The centre of the parish of Felton seems to have "experienced all the effects of this tornado; for, as was noticeable in many of the "orchards, the trees presented the appearance of a cannon ball having being directly fired "through, so completely and regularly were they blown down; that this only extended to "one half of the orchards is the most peculiar coincidence. It seems as if a line had been "drawn precisely across the middle of them, the one half remaining untouched, not the "limb of a tree having been broken off, whilst on the other scarcely a tree was left "standing, all of them having been cut to pieces, more or less. To prove the partial "results of the storm of wind, we may notice that persons residing several hundred yards "from this place had not the faintest conception of the cause of terror of their neighbours. "At Ullingswick and Withington, which are but a short distance from Felton, no damage "of this kind was enacted, and it was not until some of the dwellers in those places had "ocular proof of the devastation there that they could be induced to give credence to "such an unusual reality. In one instance we counted no less than thirty-two trees out of an "orchard numbering forty trees; these were lying on the ground with upturned roots, "several of them being of great size. In Woodland coppice great mischief was done. It "was a pitiable sight to behold many of the poor cottagers dwelling in their mutilated cots, "some of which were blown almost to pieces. Although a great deal of stock was out in "the fields and woods when the storm raged in its fury, yet not a single animal was killed, "although the poor things ran about in a frightful manner. The tornado seems to have "confined itself to a very limited area, the extent of the damage in width is very slight, "and the distance otherwise about a mile or so. The only conjecture that can be given, "I think, and it seems to be the prevailing belief at Felton, is that this great gust of wind "was compressed between two fierce storms of rain. We cannot do better, to make a "minute and exact report of this singular event, than quote the particulars as gleaned "by us from an eye witness. The first indication of the approaching storm was noticed "about half-past three o'clock in the afternoon, when the sky presented a most ominous "and gloomy aspect, and persons who were out in the fields at once wisely made for "their respective homes, under the belief that a tremendous thunderstorm was imminent. "And their anticipations were very shortly after this realized, only, perhaps, two or "three minute shaving elapsed ere the storm commenced its fury. The clouds were "observed to rise and fall in a kind of surge, and the atmosphere to fill with a kind of "fine dust. Then followed, in less time than it takes us to note it, a sort of whizzing "noise, bearing a strong resemblance to the discharge of a bullet from a rifle, which was "heard to approach from a south-westerly direction. A strong hurricane followed "this storm, loud peals of thunder accompanied by vivid and continued flashes of "lightning ensued, and, with only this preliminary notice of the ravaging hurricane, "trees were uprooted and thrown down in all directions, huge branches from the lofty "summits of trees of an enormous height were carried by the force of the wind to con "tiguous fields—in some cases for a longer distance — roofs taken off the houses, "windows broken to pieces, and in some instances blown entirely out. All this was "the work of a very short space of time—in five minutes the wind had entirely ceased, "although the rain continued in an unabated downpour for several hours."

To preserve a picture of so remarkable a visitation in such descriptive word-painting as the above quotation from the *Hereford Times* is, I consider, the obvious duty of the Woolhope Club, for whom nothing that pertains to the works of nature is too grandly magnificent or too minutely fashioned to be above or beneath reverent observation and careful record. The devastating whirlwind is but an exaggeration of that more

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frequent display of force we notice in the most insignificant *cirrhus* of dust under our feet just as the mighty strata, teeming with the records of a past life history, resemble in larger type, the drift now being formed from the muddy deposit of the merest brook; just as the huge bones of the megatherium present to us, as organic remains, objects for study in common with the tiny foraminifer. Correlation of laws, of forces, and of structures, which, the more it occupies our minds, the more it must excite our admiration of that Creative Power who institutes, who stirs, who fashions them all.

Our fourth field meeting was on Wednesday, the 20th of August, for Tenbury and the Titterstone Clee. It was attended by 30 naturalists, including members and visitors, the greater part of whom left Hereford by train for Wooferton, at which station carriages were in waiting for us. Unfortunately, owing to that prevailing fault, to which I may plead guilty with perhaps more excuse than many of my colleagues, of not sending timely notice of intention to be present, there was barely room enough for an uncomfortable squeeze into the seats provided, and to add to the inconvenience, when we reached Tenbury no accession to horse and carriage could be obtained. We, however, cheerfully made the best of the appliances at our command, and turned to the steep hill we had to ascend. Had the living horse been more vigorous, and the iron ones more accommodating, we should have had a successful excursion, for the sky was smiling although the wind blew cold, and the scenery of this part of the Teme Valley is most varied and beautiful, combining rich pasture, well-wooded vistas, and a picturesque outline. This route had been chosen partly because an ascent of the Titterstone had before been made from Ludlow, and partly to afford us the opportunity of making acquaintance with a new district well calculated to charm the lover of nature in her freshest and brightest garb. Dragging our slow way up the hill we had ample time and opportunity for scanning the valley below. Its undulations presented the varying aspects of light and shade that such a sky of alternating sunshine and cloud, as we enjoyed on that day could afford. Green banks, woods, dells, and dingles succeeded each other as we followed the winding road, passing Kyrewood House, Nash Court, and Court of Hill, beautiful seats of the notables of the district, till approaching the top of the ascent a fine view was unfolded of the more distant landmarks, somewhat obscured however by a hazy horizon. We left our carriages at the "Golden Cross," the first reached of the two or three modest hostelries on the roadside, and stopping to note the outcrop of carboniferous limestone and of superincumbent millstone grit, we arrived at the coal measures, here covered over and concealed by coarse mountain turf, a long stretch of which, between Knowbury and Cornbrook, had to be crossed before reaching the extreme points of the mountain to the northward, which bears the name of "Titterstone." Here, sitting in the "Giant's Chair," which is a remarkable protrusion of basaltic rock, we took breath to survey the glorious expanse of undulating country beneath and around us, plain, valley, mountain, and stream, all combining with distant cities and other works of man to form one of the finest panoramas our favoured land can present to the lover of scenery. To detail only the more prominent features of this wide and lovely prospect would occupy more space than I can now afford, and I may spare you the trouble of hearing a lame account of what has been so often told by better observers and describers than I can pretend to be. Attention was called to a paper "On the Geology of the Titterstone Clee Hill, and of the Knowbury and Cornbrook Hills," by Mr. Henry Johnson, mining engineer, of Dudley. This very able and interesting paper, was, in the absence of the author, kindly read by the Rev. H. W. Phillott, who, in well-modulated tones, acquitted himself admirably of the task imposed upon him by his readiness to oblige me. The paper itself, with accompanying

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plan and section, is now in my hands and, by the courteous permission of the author, will be available for our transactions. Thanks have been forwarded to Mr. Johnson in the name of the Club. No time was at our command to make a sufficiently detailed examination of the very striking scene before us, and most of its mineralogical and botanical features had to be abandoned unexplored. Taking a line by the "Forked Pole," a noted landmark on the basalt of Cornbrook, we, in a broken stream, made our way for the start back to Tenbury. Then commenced one of those *contretemps* which, by the caprice of fate, will sometimes interfere with the best regulated excursion. One of our horses would not pull *down* hill. The *ascent* he had made no objection to, and seeing the weight he had helped to convey in that direction, it did not enter into our minds to conceive that he would make any to taking the same load down again. Equine perverseness was never surely so determined and withal so unreasonable. The moment the break was put on became the signal for our steed to sit on his haunches, and no persuasion of driver, professional or amateur, made the slightest impression upon him. Shoving at the wheels with ten-man power became our only resource. On finding the full force against him of this *vis a tergo*, the remarkable animal would then make a rush for it, when the philosophers had to scramble inside and out to their places as well as they could in steeplechase form. This amusing pastime had to be repeated whenever the downward gradient became severe. Many of our less nimble friends were repeatedly left far behind, and had to be waited for, some of them being reduced to walk down the hill. Our active Assistant Secretary took off his coat in sheer desperation and swung himself to Tenbury in right pedestrian style. After recovering from our exertions, we had no time left for any exploration of Tenbury, its church, its wells, and other notabilia. Are they not, however, printed and published in full and particular detail under the title of "Tenbury Wells and its Neighbourhood," and sold, price twopence, by W. C. Tait, printer and bookseller, 18, Teme-street, for the benefit of all who desire to be informed *de omnibus rebus et quibusdam aliis* natural and artificial of the locality? After a hurried dinner we made the best of our way to the little station, and so ended a meeting, unmarked by any discovery capable of adding fame to the annals of the Woolhope Club, yet not wanting in the enjoyment afforded by pleasant intercourse, in lovely scenery, under a smiling sky.

Members and visitors present at the Tenbury Field Meeting:—Members: Elmes Y. Steele, Esq., President; the Rev. T. T. Smith, Vice-President; Mr. Thomas Cam, Mr. William C. Gibson, Mr. Timothy Curley, Mr. W. A. Swinburne, Rev. W. C. Fowle, Rev. Arthur Gray, Rev. J. H. Jukes, Rev. H. B. Marshall, Rev. E. J. Owen, Rev. H. W. Phillott, Rev. H. W. Tweed, Rev. C. J. Westropp, Rev. R. H. Williams, Mr. F. Harman, Mr. Arthur Thompson, Treasurer and Assistant Secretary. Visitors: Mr. Birton, Mr. J. P. Cæsar, Mr. E. Cameron, Mr. Harper, Mr. Charles Key, Mr. McCarthy, Mr. Charles McCarthy, Mr. J. E. Parris, the Rev. Abbot Monk, Mr. H. Mills, Mr. Phillott, Mr. F. Symonds, Jun., the Rev. Thomas Whitley.

We now approach the termination of this long, and, I fear, tedious address, as we come to the final excursion of the year, "The Famous Fungus Foray," which had been appointed for Thursday, the 10th of October. The heavy summer and autumn rains seemed to have washed away all traces of fungus life. The common favourite mushroom, *Agaricus campestris*, was nowhere, and the usual ornaments of our meadows and woods were so conspicuous by their absence that few of us anticipated any success for the foraging expedition to which so many of us look forward with delight. As it turned out, though the deluge ceased not, the industry and pluck of our more energetic and zealous fungologists were rewarded by the gathering together of an unusually fine display of rare and remarkable species. For two or three days preliminary forays on a small

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scale had been attempted, despite of the weather. Our indefatigable friend, Dr. Bull, who is the life and soul of these campaigns, had kept his men-at-arms up to their work, and many a distant contingent had contributed handsomely to the plunder. On our arrival at the Green Dragon on Wednesday we found that a signal honour had been conferred upon the Club by the arrival from North Wales of Mr. and Mrs. Lloyd Wynne, of "Coed Coch." The lady, whose pre-eminent knowledge and important discoveries in Mycology, have been celebrated by the noble veteran Berkeley, needs no encomium from me, but all who had the rare pleasure of associating with her in the field or at the fungus exhibtion, must have been struck no less with the familiar acquaintance she possesses with this difficult branch of Natural History, than with her kind and courteous readiness to impart to all inquirers the results of her extensive experience. Mr. Worthington Smith, assisted by Mrs. Lloyd Wynne, Mr. Broome, Dr. Bull, and Mr. Plowright had taken great pains to arrange a fine collection, comprising not a few species seen for the first time, and many more so rare as to be only known to advanced students of the science. This arrangement was of immense service to those who, having a moderate knowledge of funguses, were desirous of obtaining a clear idea of this remarkable and interesting group. Tables had been set out around one end of the large room in which the meeting, and subsequently the dinner, were to take place, and on them a series of specimens labelled with their respective names, *generic*, *subgeneric*, and *specific*, were displayed in consecutive order, commencing on the left with "Hymenomycetes," "Agaricus," "Leucosporei," "Amanita"—so successively distinguishing each grade, in the descending order observed by Fries, from the highest and most perfect to, far on the right, the lowest and simplest forms. Thus was presented a panoramic view, not otherwise obtainable, and which, for instructive distinctness and comprehensiveness, could not be surpassed. I need hardly say that so admirable an opportunity for study enlisted universal satisfaction and acknowledgment.

My kind friend Dr. Bull has promised to give us an appendix to this report of our foray, containing the names of all the species exhibited or found during the subsequent field operations, enriched with his commentaries on the more rare and interesting kinds. I shall not, therefore, attempt to give a record of them but pass on to note the occurrences of the principal day. The appointed Thursday, following a night of heavy rain, wore a very threatening aspect, but Mrs. Lloyd Wynne, supported by Mrs. Cooper Key, having signified her willingness to brave whatever the elements might have in store for us, no Woolhopean could be craven enough to fear. Escorted by your President, with Dr. Bull, Mr. Lloyd Wynne, Mr. West, and other doughty knights of the field, these ladies committed themselves bravely to the perils of the road. The advanced party, thus formed, after arriving at the turn leading directly to Whitfield Park, left it to the right and diverged by another road which brought them to the south of Treville Wood, Dr. Bull having planned for us to scour across this excellent foraging ground on our way to the park. Unfortunately the exact line of march had not been marked out in the programme, and, after arrival at a small school building, which was to be the trysting place, we waited in vain for our friends, whom we had last seen assembled in front of the Green Dragon, ready, as we supposed, to mount and follow us. So long a delay here occurred that a council of war was called and having arrived at the unavoidable conclusion that no ordinary *contretemps* could account for the non-arrival of the missing carriages, but that a misapprehension as to the proposed route had led them direct to Whitfield, we did all we could do under the painful circumstances, and went on our way without them. We crossed fields and wound up narrow roads and paths till we reached Treville Wood. Here, for the first time, our search for funguses was rewarded, and our

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baskets began to fill with treasures so many that our excursion, had it been confined to this locality, could not be looked upon as less than very successful. We had scarcely left the wood behind us ere heavy rain came on, and the nearer we approached to the beautiful grounds of Whitfield the more violently blew the storm. Nowise daunted we battled bravely with its fury, the ladies setting us a noble example of patient and cheerful resignation to the adverse decree of Jupiter Pluvius, but, as may well be imagined, as we bent our way along the charming walks of the beautiful park, the noble trees and varied vistas were not enjoyed, or seen to advantage, as they would have under more favourable auspices.

Arriving at the noble mansion of the Rev. Archer Clive, we found our lost wanderers sheltering from the pouring rain in the stable yard. Mr. Worthington Smith was one of these, and, as he saw nothing whatever of our brave efforts in the cause of science against the whirlwind and the storm, he, doubtless in a somewhat jealous mood, drew deeply upon his imagination for the materials of the fancy sketch he afterwards gave to the readers of the "Gardener's Chronicle." All caricature notwithstanding, your President will ever feel proud of the honour that fell with pleasure to his share on this memorable foray, when escorting gentlewomen who charmed him with their wit and learning no less than with their kindliness and grace.

The Rev. Archer Clive, hearing of our arrival, most kindly came forth through the drenching rain to give us welcome to his hospitable mansion, where a sumptuous luncheon was prepared, and of which we partook to recruit our forces somewhat exhausted by unwonted exertions. Thanking Mr. Clive for his courteous reception, we turned our faces towards Hereford, the ladies most graciously making room for your President in the close carriage reserved for their accommodation, and arrived at the Green Dragon in good time for dinner. Having repaired the damages sustained in the foraging expedition, Mrs. Lloyd Wynne and Mrs. Cooper Key condescended to honour us with their presence, and a goodly company, comprising no fewer than forty-two guests, sat down to an excellent and much needed repast, whereat several kinds of edible fungi were much approved of as a *bonne bouche*. After dinner, reference was made to the exhibition in the room, which was acknowledged by connoisseurs to be one of the most perfect they had ever seen.

Dr. Bull announced that the Rev. Wm. Poole, one of our members, offered to present to us a photograph of "St. Catherine's Oak" which grows on his property, near the Homend, Ledbury, above "St. Catherine's Spring," a fountain that issued forth to refresh "the blessed Catherine, of Ledbury," when, one day, exhausted by her travels she rested at the spot. This is the same good lady whose mare and colt were stolen by a girl in pattens, of which the tracks, in answer to the Saint's prayers, were left in the rocks they passed over. The kind offer of Mr. Poole was acknowledged, and gratefully accepted on behalf of the Club. Then Dr. Bull sent round a choice selection of drawings, admirably executed by his pencil, of rare and interesting species, exciting the unanimous desire that such life portraits of remarkable funguses might be permitted to adorn future volumes of our transactions. Mr. James Renny gave an excellent account of his more recent investigations of mucedinous fungi, more particularly describing two new species illustrated by exquisite water colour drawings and respectively named by him after Mr. Cam and Dr. Bull. As I hope to obtain from Mr. Renny's kindness a paper on these microscopic fungi and on others no less interesting, I shall not dwell further on Mr. Renny's labours than to say that we thankfully acknowledge to have derived most valuable information and assistance from him, and that, remembering the many agreeable associations con-

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nected with his visits to Herefordshire and to Monmouthshire, we shall look forward with delight to his joining on many another foray the host of friends he has made in the Woolhope Club. A discussion followed on sundry subjects fungological, mainly supported by Mr. Broome, the Rev. J. E. Vine, Mr. Worthington Smith, Mr. Plowright, and other learned mycologists, several of whom finished the evening under Mr. Cam's hospitable roof, where microscopical investigations and the study of choice descriptive and illustrative publications occupied them till a late hour; thus appropriately concluding a most instructive day, which deserves to be remembered as a signal success in our annals.

Members and visitors taking part in the Foray and meeting:—Members: Elmes Y. Steele, Esq., President; Rev. T. T. Smith and J. Griffith Morris, Esq., Vice-Presidents; Timothy Curley, Esq., John Lloyd, Esq., and C. G. Martin, Esq., Central Committee; Worthington Smith, Esq., Honorary Member; Dr. Bull, Thomas Cam, Esq., Rev. Archer Clive, Rev. James Davies, James H. Davies, Esq., Rev. W. C. Fowle, William C. Gibson, Esq., F. W. Herbert, Esq., Rev. J. E. Jones, Machen, Rev. H. Cooper Key, W. A. Swinburne, Esq., Lieutenant-Colonel Symonds, W. H. West, Esq., Rev. F. S. Stooke, Rev. R. H. Williams, and Mr. Arthur Thompson, Treasurer and Assistant-Secretary. Visitor: Mr. and Mrs. Lloyd Wynne, Mrs. Key, C. E. Broome, Esq., Rev. W. Houghton, William Phillips, Esq., C. B. Plowright, Esq., James Renny, Esq., Rev. J. E. Vyse, — Riddle, Esq., Worcester College, Oxford, Rev. W. Taprell Allen, J. E. Cameron, Esq., Dr. G. Thomas Jones, Downton, Louis Hart, Esq., and T. C. Harris, Esq., Demerara, E. Haggard, Esq., J. C. Kent, Esq., F. C. Symonds, Esq., Reginald Symonds, Esq., Elmes Steele, Esq., Jun. Business transacted: The following Officers were elected for the year 1873—President: Rev. James Davies, Moor Court; Rev, Arthur Gray, Orcop, Ross, Rev. H. W. Phillott, Staunton-on-Wye, W. A. Swinburne, Esq., Dulas, Hay, Rev. R. H. Williams, Byford, Vice-Presidents. Central Committee of Management: Thomas Cam, Esq., Timothy Curley, Esq., John Lloyd, Esq., C. G. Martin, Esq., J. Griffith Morris, Esq. Honorary Secretary: Rev. Sir G. H. Cornewall, Bart., Moccas Court, Hereford. Treasurer and Assistant Secretary: Mr. Arthur Thompson, 12, St. Nicholas-street, Hereford.

In the survey that I have thus imperfectly laid before you of our proceedings during the past year, there is nothing to reflect much lustre on our Club as exhibiting scientific research, or laborious activity in the pursuit of the riches which we know must be lying in wait around and beneath for those who may have the skill and patience to find them. In geology we have made no advance, although doubtless some of us may have improved our acquaintance with what has been already recorded. In botany, always excepting our favoured funguses, the only novelty recorded consists in the introduction to the Herefordshire Flora of the *Asplenium viride*, which has been signalised by Mr. Smith, of Hay, from the Black Darren, an outline of the Black Mountain range. This small, and, but for its rarity, somewhat insignificant fern, which for elegance and luxuriant beauty, is far excelled by its charming ally, the common *Asplenium Trichomanes*, has long been known to have an established habitat in the wilder recesses of some of the Monmouthshire and Radnorshire Mountains, within reach of the Woolhope botanists, notably in the Llanthony Valley, near Capel y Ffin, where it fringes the escarpment of Old Red Sandstone, and will freely repay the searcher who will take for his guidance the travertine now forming, as for ages past, from the deposit of carbonate of lime given off by a streamlet as it plunges over the escarpement that joins the Honddu in the valley below. The light colour of the travertine, in contrast with the black rock, gives an excellent landmark, but the scaling of the precipice is rather tough work.

In entomology we have the discovery by Mr. Harman of two species of Lepidoptera,

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new to Herefordshire. These comprise all the novelties that have, to my knowledge, been recorded during the year as finds of the Woolhope Club. Always, as before said, excepting the funguses.

"*Neque semper arcum tendit Apollo*"

Thus, it would seem that our more zealous members have lost something of their wonted energy, and many who have joined in our excursions have been rather dillettanti philosophers than active workers in nature's fair and generous field. Let us hope that, in accordance with the French saying "reculer pour mienx sauter," they are only resting for a season, and that, ere long, the hammer and vasculum will reveal new treasures, signs and tokens of a happy revival. Field Naturalist's Clubs appear to be subject to the laws which govern enterprise throughout the world, and even the operations of Dame Nature herself. After the storm, be it natural, political, social, or philosophical, comes a calm. A member of our Association, almost from its birth, I can remember many an alternation, anon a flash followed by glimmering lights, for a time cerebral activity would be dominant, and again a state of repose would ensue with but a fitful spark to denote that the sacred fire was smothered for a time but not extinct. Our last and grandest storm has recently passed away; it lasted five years; our Jupiter Tonans was Dr. Bull. It is to him, I say it emphatically, that we owe the spirit infused into us during those five years. I do not depreciate in the least the talents or the works of those who helped him in composing and collecting materials for those volumes, which have shed, far and wide, lustre on the name of the Woolhope Club, but *he* was the masterspirit who evoked, who ruled and guided the genius of the storm. He brought out the chariot, he harnessed the steeds, he handled the ribbons and lashed the whip, but, unlike Phœton, he guided us home in safety, and he now tells us to take our turn. The mantle is ready at hand, will no man of might, no second Jehu, gird it about his loins?

Your last President, who this evening, lays down the sceptre you have entrusted to his feeble hands, has not been able to do anything for you. May his successor, the Rev. James Davies, of Moor Court, prove himself a brave and victorious chief in our happy hunting grounds, and may mighty spoils adorn your girdles when he guides you in the chase!

Setting aside all metaphor, such work as Dr. Bull undertook for us, demands a combination of talents with facilities that falls to the lot of very few. You all know too well his fitness for the task he so successfully carried out, to require that I should do violence to his modest wish to be spared a suitable recognition of the untiring energy, rare comprehensiveness, and masterly command over work, even to the minutest detail, which have signalised his labours in our service. But, gentlemen, if Dr. Bull has set his face resolutely against the acceptance of a substantial proof of our heartfelt acknowledgment, he cannot entirely escape from the consequences of his own deeds, or smother the feelings of regard, of admiration, and of gratitude for his courteous, indefatigable, and most successful efforts to promote the usefulness and the welfare of our Association. As your President, I may be said to be making a last dying speech and confession, and, if in no other respect I can have done ought that may be acceptable to you, I know that in thus speaking of Dr. Bull I am giving expression to the sentiments of every member who has had the pleasure of meeting him in the field or has profited by the fertility of his ever ready tongue, his facile pen, and skilful pencil.

Our Club, in its financial aspect, appears to be sound, and the continued accession of new members attests its popularity. As time rolls on changes must occur, old and well-known faces disappear, and many leave their mark behind them. Last year Mr. Cam, in his retiring address, alluded to the loss science had sustained by the death of Sir Roderick Murchison. This year another luminary, also for a long period an honourary member of

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the Woolhope Club, has been extinguished. The Rev. Canon and Professor Adam Sedgwick, at the ripe age of 87. His fame and achievements as a great British Geologist are of world-wide recognition, and require no comment. It seems to be within the fitness of things human and scientific, that the two eminent philosphers who combined their labours for the erection on a solid foundation of the Silurian and Cambrian systems, respectively their greatest trophies, should in the maturity of age, in the fulness of fame, leave almost together the scene of their long and successful labours.

One word of advice before we part. At the close of my former term of office I took occasion to lay some stress on what I conceived to be failures due to faulty organisation or management of our excursions. I feel the less hesitation in returning to the charge because the term just concluded has not been free from the same errors, due in one or two instances, doubtless, to my own laxity and deficient foresight. The weather is not at our own command, and it is not often that we can prevail on the railway officials to go out of their way to serve us; but there are certain conditions, paramount to the success of our expeditions, which are perfectly under our control. I allude more particularly to the following:—A judicious choice of localities; a *careful preliminary survey* by officers and voluuteers of the features of the scene selected; a well-digested programme of the contemplated proceedings, embracing *no more work* than can be *fully* and *easily* gone through in the time allowed; a strict and almost tyranical *adherence to the programme*, permitting no afterthought or diversion to lead companies away from the main body, no scattering or dallying when the march onwards is called by the leaders of the expedition; finally, compliance with the request, ever made but too seldom observed, to give timely notice to the Assistant Secretary of intention to join the excursion, dinner, &c., of the day. I attach some importance to these recommendations, because they are the fruit of long experience and observation. Whenever such conditions have been adhered to, the Field meetings have been successful even in bad weather; when they have been overlooked or neglected, no sunny smiles have counterbalanced disappointment and annoyance.

There is nothing more left for me but, with regret, not unmixed with a feeling of relief, to resign the office you have entrusted to me. Regret, because it is to me great honour and pleasure to perform the duties of President over a society comprising so many who, held together by a loving search after truth, are in every other sense worthy of my highest esteem and respect. Relief, because I feel keenly that my work has been but a slovenly performance at best. All that I can pretend to is the anxious desire to help in promoting the success of the club, and the enjoyment of every member of it. My very limited allowance of talent and of leisure must baffle my attempt, let my earnestness be what it may. Regret and relief are more than outweighed by hope for a good time coming, when my successor and his lineal descendants shall lead you to "fresh fields and pastures new," redeeming by successful achievements, in a long succession of years, the failures of the past.

Members elected during the year 1872:—The Rev. G. Bright Bennett, Hereford; J. F. Symonds, Esq., Hereford; E. H. Greenly, Esq., Titley, Kington; A. D. Berrington, Esq., Pant-y-goitre House, Abergavenny; Colonel Byrde, Goitre House, Pontypool; E. Colt Williams, Esq., Hereford; the Rev. F. L. Stooke, Wellington Heath, Ledbury; A. C. Crutwell, Esq.; William Henry Lloyd, Esq., Thomas Clifton Paris, Esq., Hereford.

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THE REMARKABLE TREES

OF

HEREFORDSHIRE.

THE COWARNE COURT OAK, 1870.

(Q. Pedunculata.)

The bole of this fine Oak still stands erect, as represented here, in the small dingle on the north side of Cowarne Court, the property of Lord Leconfield. The lower part of the tree is swollen out by protuberances to the great circumference of 37 feet 8 inches, at 5 feet from the ground; from this part the trunk, rapidly narrowing, rises to the height of 25 feet. The old tree is now railed in for protection. *(See Transactions for* 1870, *p.* 310.*)*

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The Woolhope Naturalists' Field Club.

NOTES ON COREMIA QUADRIFASCIATA AND MACARIA LITURATA—TWO LEPIDOPTERA NEW TO THE COUNTY OF HEREFORD.

By F. E. HARMAN, Esq.

Gentlemen,—I have been requested to bring to your notice at this meeting, the capture, during the past year, of two Lepidoptera new to this county, namely, Cormia quadrifasciata and Macaria liturata. I look upon the occurrence of the former as extremely interesting, as I believe it is not only the first time it has been taken in this county, but the first instance of its being found on any older geological formation than the chalk. Stainton, in his "Manual of British Butterflies and Moths," gives only three localities for this insect, Guildford, Stowmarket, and Cambridge. Newman, in his "Natural History of British Moths," says, "It was formerly so common about Godalming, in Surrey, that it was turned out of the net when taken." It has since been taken by the Cambridge collectors, and by Dr. Bee, at Stowmarket. These localities give one the idea of a local chalk frequenting insect. The larva is said to feed on low plants and hawthorn, but whether in its younger stages it feeds on hawthorn and then descends and finishes its life on low plants, or eats both at all periods of its existence there is no evidence to show. As only one specimen, and that a male, was captured, I am at present unable to set this point at rest by rearing from the egg, which would be the surest way to get at its correct food plant. It would also be interesting to note whether it throve more on food gathered from off limestone or marl, and whether the food so given influenced the deepness of colour. I met with this insect by beating a hawthorn hedge on the 26th of last June, just where a bed of limestone crops up and extends for about an acre just beneath the surface. The soil over this patch is black and almost peaty, but full of small fragments of the stone, and is of a different character to any land surrounding it. It superficially resembles the wet patches that are met with here and there on the chalk downs about Brighton, so that if the larva feeds on a particular plant it is possible that it may occur here and nowhere else in the neighbourhood. I am not aware of any similar spot in this district. Quadrifasciata is briefly described by Stainton in his "Manual of British Moths," as having, when in its perfect state 'the four wings gray, posteriorly grayish, ochreous,

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with a broad dark gray central band; second line angulated and wavy, edged with whitish; central spot oblong and black.' It expands somewhat over an inch and occurs in the months of June and July. Like the rest of the genus Coremia it has the antennæ of the male pectinated, the abdomen marked with a double row of black spots, and entire rather rounded wings. Pupa subterranean. Thibner describes the larva as 'yellowish gray, marbled with brown, spiracular line blackish, sometimes interrupted.' According to the same authority it is found in April, May, and August, probably being hatched in August, hybernating when young, and feeding up in Spring. The other insect I would notice is Macaria liturata, the 'tawny barred angle' moth. Like Quadrifasciata it has only made its presence known by one specimen being taken. I took this on the 29th of May, and it is almost the only instance I have met with this season of an insect showing itself before the usual time of emergence. It was taken in a fir-wood in company with a number of Fidonia piniaria, who were gaily flying about in the sunshine around their food plant, the common Scotch fir, on which tree Liturata also feeds when in the larva state. The usual time of emergence is the month of July, when it may be found at rest by day in many counties where there is any quantity of Scotch fir growing. It is recorded as abundant near Manchester, and common in many other places. The imago is shortly described as expanding from an inch to an inch and a quarter, with fore wings of a slaty gray; first, second, and central line indistinctly darker, but appearing as black spots on the costa; beyond the second line is a yellowish band edged towards the costa with tawny. Like the other two species of the genus Macaria, it has oblong fore wings with a slight hook at the tip, and a rounded indentation below, forming a very marked characteristic; the hind wings are rather indented with a prolonged caudal angle. The antennæ of this species are slightly pubescent in the male—in the other species of the genus they are simple—in all they are simple in the female. The larva may be secured by beating the Scotch fir in September. It feeds on, and much resembles the needles of that plant, no doubt for purposes of concealment. It is green, with fine white stripes and a brown head. It turns to a pupa on the surface of the ground, and remains in that state all the winter. These two insects are the only ones I took new to the county last season, but I have much pleasure in recording the capture of a second larva of that very rare moth, Acronycta alni. It was brought to me on a nut leaf, but as the bush it was found on was directly under an oak it might have dropped from an overhanging branch of that tree. Like a former larva I had the good fortune to secure, it preferred Alder to all other food, drank a large quantity of water, and rested on the upper surface of the leaf.

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The Woolhope Naturalists' Field Club.

MEETING AT BREDWARDINE.

FRIDAY, JULY 26TH, 1872.

The third field meeting for the season of the Woolhope Naturalists' Field Club was held on Friday, July 26th, 1872, at Bredwardine. This being the ladies' day, the meeting was graced by the presence of a number of ladies; and the spectacle presented, as the visitors streamed up the hill-side amid the rich foliage, or grouped themselves around the cromlech, or were gathered at their pic-nic on the beautiful knolls entitled "The Clumps," was very bright and picturesque. The president (Mr. E. Y. Steel, of Abergavenny), was unfortunately unable to be present, and his duties for the day were performed by the Rev. Sir G. H. Cornewall, Bart., and there were present also Mr. Curley, F.G.S., C.E., and Mr. John Lloyd, vice-presidents; and a party of the following members and visitors:—Lady and Miss Cornewall, Mr. Herbert Wood and Mrs. Wood; Mr. and Mrs. Lloyd, Huntington; Rev. and Mrs. Underwood, Madley; Mr. Giles, and Mrs. and Miss Giles, Byford; Mr. Thomas Swinburne and Mrs. Swinburne; Mr. H. A. Swinbourn and Mrs. Swinbourn; Miss Bowen, Hay; Miss Hammond; Rev. James Davies, Moor Court; Miss Mary Davies; Miss M. Cleay; Mr. J. H. Davies; Mr. H. P. Davies; Rev. T. Woodhouse; Mr. Edward Colt Williams and Mrs. Williams; Rev. J. M. and Mrs. Metcalf; Mr. F. H. Herbert; Rev. J. Houseman, and Mrs. Houseman, Rev. J. E. Grasett, Miss Matthews, Mr. J. E. Smith, Hay, and Miss Smith, Mr. Flavell Edmunds, F.R.H.S., Mr. and Miss Emson, Rev. C. J. Robinson and Mrs. Robinson, Miss Trench, Rev. Jos. and Mrs. Hill, Miss Newton, Miss Gibson, Mr. H. C. Gibson, Mr. James C. Cameron, Mrs. Kendall, Miss Saunders, Mr. McCarthy, Rev. T. and Mrs. Phillipps, Dewsall; Rev. H. R. Marshall and Mrs. Marshall, Rev. R. Bishop, Colonel and Mrs. Byrde, Mr. Harmer, Mr. J. F. Symonds, and Misses Symonds (2), Miss Garrett and Miss Teir, Misses Redford (2), Mr. Henry Hall and Miss Button, Mr. R. Beddoe, Mr. A. Thompson, Miss C. Thompson, Major Williams, Mr. Stooke.

By the kind invitation of Sir G. Cornewall, the party from Hereford, which was joined at Stanton Portway by the Rev. James Davies and party, passed

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along the fine avenue of trees known as Monnington Avenue, and thence by the private bridge across the Wye through the beautiful park of Moccas to Moccas House. Here they were received by Sir G. Cornewall and his party, and, after a brief stay, proceeded under his guidance, through the deer park to Bredwardine, admiring on their way the magnificent trees which abound in the park. The noble lime trees of both species (Tilia Europea and Tilia parvifolia), were glorious masses of foliage and fragrance, while the splendid oaks and other trees of unusual magnitude also challenged admiration for their great height, vast girth, and rich foliage. The leafy shade, too, was intensely grateful as a shelter from the great heat of the sun, the day being one of the hottest which we have experienced since the great thunderstorm and whirlwind of Sunday, July 14th.

At Bredwardine, parties from Hay, and the Rev. Mr. Houseman, the rector of the former parish, joined the assemblage in the great work of the day—which proved to be one of considerable difficulty—viz., the ascent of the hill to Arthur's Stone.

On the way, a few of the party diverged, under the guidance of Mr. Housman, to visit the mistletoe oak recently discovered by Sir G. Cornewall, which was viewed with great interest.

The party re-assembled at the cromlech, or so-called druidical monument known as King Arthur's Stone, which is situated in the middle of an ancient road, probably British, leading along the ridge to Merbage Point, and thence to Clock-mill where it joins the road to Hay along the south bank of the Wye. Arthur's Stone has been so often described as to need little to be said about it, save that it is a true cromlech evidently of great antiquity. It consists of a superincumbent slab of old red sandstone, probably brought from a neighbouring quarry on the west or Dorstone slope of the ridge, which is now broken in two ways. The lower stratum has become detached from the upper, and has fallen partly to the ground, while the upper portion, which is about two feet thick, and is estimated to be about 40 tons in weight, is split across the middle. The stone, however, is still supported by the six smaller stones upon which it was originally placed. It is surrounded at about eight feet distance by a circle of stones of considerable size, which are now mostly covered with greensward. There seems to have been an inner circle of upright stones about four feet high, of which only four are now to be traced, the remainder having probably been broken up and carried off to mend the road, or for some other purpose. One of these stones, which is singularly marked as though with a gigantic thumb and two fingers, lies on the roadside, where it is shown by some relaters of local tradition as bearing the marks of King Arthur's knees, as he knelt down, while others declare that the marks are those of his thumb and fingers, when he was playing at quoits. The marks themselves seem to have been produced by water, and are analogous to those produced upon the edge of a bed of rock where the stream breaks into tiny cascades, such as are common in the bed of the Wye near Builth and elsewhere. How the stone

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reached its present position is of course a matter for conjecture, but it is probable that it was with the other smaller stones brought from the Wye.

On the Dorstone slope of the hill, and in the valley, some large travelled stones are found, which would seem to suggest that at one time there had been an avenue of stones marking the ascent to the cromlech.

It is much to be regretted that this interesting relic of a far-off time is left in its present state of utter neglect, a prey not only to the destructive action of the seasons, but also to the heedless ravages of mankind. It would require no great expenditure at least to clear the outer circle of stones of the earth which has accumulated upon them, and thus to lay bare to the observer the exact nature of the place, and it would be a trivial sacrifice of land to divert the road a little to the eastward, so as to save that side of the circle from further destruction. It is possible that the excavation necessary for the purpose would be rewarded by discoveries of articles of interest, but in any case the diversion of the road would be an easy way of preserving this fine relic from casual or wanton damage. As the only monument of its class in the county, it merits some little care for its own sake, while such care would relieve the archæologists of the county of some discredit which the present neglected condition of the stone justly throws upon them.

As the party were grouped around the stone, the Vice-Presidents and some other gentlemen present invited Mr. Edmunds to say a few words on its history.

Mr. EDMUNDS, in responding to the unexpected call, said that he was much in the position of Canning's knife-grinder, when asked for his story:

Story, Lor' bless ye, I have none to tell, Sir!

He had not been able to find any historical references to King Arthur's Stone, while the legends were few and imperfect, yielding no distinct ground even for plausible conjecture as to the person to whom or the time when that structure was reared. The name was rather patriotism than history. There is no reason for supposing that King Arthur ever ruled in this district. It is true that the existence of Arthur had been disputed, but the doubt seemed to the speaker an unreasonable one. There was certainly a real King Arthur who ruled the district now known as Somerset, Devon, and Cornwall, and whose body was found buried at Avallonia in the reign of Henry II., but there is no reason for connecting him with this cromlech unless we take the name as a patriotic myth. As the great national hero, Arthur was to the Briton the symbol of the glorious past of their independence, and everything remarkable or interesting seemed to be consecrated by bearing the name of Arthur. Thus we have mountains, cromlechs, stones, and other objects in distant places where Arthur never ruled, as well as in his own little kingdom, named from the hero-king. Of course where nothing certain was known there was a fine field for conjecture (a laugh). The archæologists had "ample room and verge enough" for theory. There were indeed some facts, very massive and imposing and undeniable; there was the huge table of stone, the *crom-lech*, or covering stone, its firmly fixed supports,

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the remains of a small inner circle, and the large outer circle covered with earth and greensward, and fragrant with purple thyme and other wild flowers, upon which the audience were seated. These were the facts, and all he could do was but to endeavour to explain them from other monuments of the kind which he had visited. The ground plan, for example, seemed to be a miniature of that of Stonehenge, which, however, had no central cromlech. He thought it was probable that the circle had been double, a passage being thus left all round, although only one of the inner ring of stones was left standing. The circular form was to his mind conclusive evidence of British work. The Briton's mind seems to have been full of the circle: the circle of the heavens, the circle of the sun, the circle of the moon, the circle of the seasons, seem to have suggested the idea, which the Briton carried out in his camps, his dwellings, his temples, his burial places. Just as the Roman founded all his works on the right line and always used the square or the oblong, a square and a half. In this case, he thought the cromlech was built first. Some great Silurian chief was brought thither with rude pomp and ceremony; his body was placed on the ground, covered perhaps with a little earth; the body of his favourite horse was laid at his feet, and his weapons by his side, and the huge *llech* or covering stone was brought up an inclined plane upon rollers, and so placed by the strong arms of a nation as a memorial of their lost chief to future ages. All this would be done, as the old British phrase has it, "in the face of the sun and in the eye of light," and amid a band of white-robed Druids and bards, while the armed throng formed a reverent circle around. Then, too, at night, if we might follow some interpreters of the bards, the hollow place beneath the cromlech might be used in the initiation of neophytes. Lonely watching in the house of death has always been supposed to confer wisdom, and especially prescience, upon the watcher, who regarded it as the house of life to his spirit. Here he communed with the invisible world, and from hence he issued after his vigils (like the knight of mediæval times) pledged to a new life. Perhaps he ought to apologise for detaining the audience so long with these theories and conjectures, but he had told them that he had little of information to give them; and they would all agree with him that when one has really little to say it sometimes takes a great many words to say it (applause).

The Rev. JAMES DAVIES expressed the obligations of the meeting to Mr. Edmunds for his most interesting address, and added that if that was an instance of a person having little to say they all felt that Mr. Edmunds had said it extremely well (applause).

Mr. LLOYD also expressed the interest which he had felt in the address.

Mr. J. E. SMITH said that some writers looked upon Arthur as the sun, and the legends regarding him as myths of the sun-worship. "Ar" was said to be a word meaning light.

Mr. EDMUNDS doubted the correctness of that theory. He knew the word *ar* as meaning land, and *lux* and cognate words as meaning light, in the Celtic

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and Teutonic tongues, but he knew nothing of *ar* as meaning light in those tongues.

Sir GEORGE CORNEWALL, who had arrived while Mr. Edmunds was speaking, expressed his regret that he had accidentally missed the address. What he had heard had greatly interested him.

The party then made their way to the beautiful "Clumps" above the village of Bredwardine, where they partook of lunch. Afterwards the club held an ordinary meeting, when some formal business was transacted.

Sir GEORGE CORNEWALL then announced that the only paper to be read that day was that of Mr. Edmunds and Mr. Curley, who had visited the scene of the destructive whirlwind of Sunday week. (See the succeeding page.)

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ON THE WHIRLWIND AT FELTON AND BODENHAM, ON THE 7TH JULY, 1872.

By F. EDMUNDS, F.R.H.S., and T. CURLEY, C.E., F.G.S.

The occurrence of a tornado or whirlwind in this county on a scale of noticeable magnitude is an event so rare, and one which gives so deep an interest to the natural history of the county, as to constitute it a proper subject for record in the annals of the Woolhope Naturalists' Field Club. The suddenness, the unusual extent, and the magnitude of the damage wrought in a few minutes in the present instance, mark it out as thus far unique in our local history. Hitherto, at least for many years past, our Herefordshire whirlwinds have been mere babies, catching up a haycock, or clearing a hedge of linen, or absorbing in their eddying motion the straws and rubbish of the road, or occasionally sucking up in their flight the contents of a pond, slime, frogs, and all, and pouring them forth upon the neighbouring road, as happened two years ago on Athelstan-hill, Hereford; but these vagaries are merely some of the "common things" which people never try to understand, and vote the attempt "waste of time." To the student of nature there is nothing trivial which shows the working of great laws, and indeed the smallness of the example is a convenience, making the investigation easier and likely sooner to lead to a correct perception of principles. The whirlwind of Sunday week combines both attractions, being at once of manageable compass for the inquirer, and sufficiently destructive to arrest the attention of the unscientific.

The phenomenon variously known as tornado, whirlwind, tyfoon, or hurricane, is one of frequent occurrence taking the earth's surface as a whole. Although rare in this country, it becomes more frequent as we near the equator, whether the observer approach from the S. or the N. The general fact is important as pointing directly to the theory of storms, which is that they are caused by solar heat, setting free the electricity of the atmosphere. Our knowledge of the causes of these destructive occurrences is yet too imperfect to warrant us in supposing that the science of storms is more than a highly probable theory. This is not surprising when we remember that it was not until the middle of the 17th century that scientific observations of storms began; that the study was greatly neglected for a century afterwards until Dr. Franklin approached it from the side of electricity; and that it has been systematically prosecuted for only some fifty or sixty years.

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The observations hitherto made, seem, however, to have established some important principles, which I may briefly recapitulate from the writings of Franklin, Redfield, Colonel Capper, Colonel Reid, and Professor Espy.

A tornado (from the Spanish *tornar*, to turn round), is defined as a sudden and violent storm of wind, accompanied by thunder, lightning, and heavy rain, occurring about the time of the equinoxes or (in the tropics) at the changes of the monsoons. The storm continues in one place a short time, days or hours, during which time the wind blows at once or successively from all points of the compass. The storm moves onward in a straight line for some distance, but at the same time revolves around a centre, and the rush of air carries upward objects which are included within the vortex. Sometimes the force is so great, that even trees, houses, and other large objects are whirled upward or torn to pieces, which fall in opposite directions. The centre may be absolutely calm, while objects at the outside of the whirl or vortex are exposed to winds of immense fury and violence. The vortex may be many miles or merely a few yards in diameter, while the path of the storm may extend for hundreds or even thousands of miles. The cause is supposed to be the rarefaction of the air in a given spot, usually within the tropics, which liberates the electric fluid; the rarified air ascends, and the cool air all around it rushes in to the partial vacuum thus produced. The particles of air, forming the different currents caused by obstructions on the earth's surface, strike each other at different angles, and thus acquire spiral or circular motion. These whirlwinds seem to be always connected with electrical discharges. Sometimes, the storm commences with contrary currents of air forcing black clouds in opposite directions; the rarefaction causes the lower stratum to ascend, the clouds come into collision, and there is a thunderstorm, followed by a whirlwind. At other times the whirlwind is preceded by an unusual stillness of the atmosphere, in which the whirling motion commences suddenly, and is followed by thunder, lightning, and rain. At other times, as on Sunday, July 7th, the whirlwind seems to occupy a central position between two storms; but in most cases the rotary motion rapidly increases as the vortex passes on, until its fury is spent. The duration of its extreme violence does not continue in any one place or district more than half an hour, and in most cases the period is very much shorter. A few minutes is about the average. Our little whirlwind of Sunday week, July 3, lasted for a period of time variously estimated by observers from two to five minutes. The rate at which the vortex travels varies from 30 to 100 miles per hour.

In a whirlwind, it has been found that the direction of the rotary motion in the Northern hemisphere is invariably from N. round by W. to S. and E.; in the Southern hemisphere the reverse.

The precise mode in which the result is produced is a matter upon which there is a difference of opinion. For example, Dr. Hare, of the University of Philadelphia, considers that the immediate causes of those storms are electrical discharges between the earth and the clouds, which liberate heat and

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precipitate the water which is held in suspension in the form of vapour; that partial rarefactions are thus produced in the upper part of the atmosphere, in consequence of which currents of air ascend from the earth and others rush in from different parts of the horizon to supply the deficiency at the spot from whence the air ascended. A whirlwind is thus the exact opposite of a whirlpool; in the one the neighbouring particles of water rush downwards to a centre; in the other they rush upward; and in each case being met obliquely by other currents their motion naturally assumes a rotary or spiral direction.

Mr. Redfield, of the Am. Phil. Society, thinks that the whirlwind consists of *two* movements: in the lower part of the atmosphere a spiral motion inclining downward, and in the upper region a similar motion rushing upward. This theory rests on the fact that sometimes an upward motion has been observed in the clouds before the storm reaches the earth's surface. It does not appear, however, that this theory is founded on any large induction of facts; and at present the balance of evidence seems to be in favour of the simpler solution, viz., that the whirlwind ascends from the lower region of the air towards the higher, and is produced by the rarefaction and consequent ascent of the heated air.

Sir John Herschel thinks that the Gulf Stream is the cause of the parabolic curves assumed by the path of the storms on the American coast; and it is certain that they are found very frequently to follow the course of the Stream from W. to N., while the increased temperature of the Stream may disturb the equilibrium of the atmosphere, and thus carry forward storms which originate in the tropics.

It is to be noticed that these general laws (as they seem to be) are subject on land to local and temporary causes, such as the direction of mountain chains, ranges of hills, or isolated summits or depressions, which produce looped curves, and sudden and irregular changes in the direction of the wind at the surface of the earth, where of course it is first and most completely observed. On water, as these causes do not exist, the course of the storm is found to obey the general laws already explained.

The whirlwinds of the Atlantic, which are the only phenomena of the kind important to our subject, commence in that part of the ocean which is marked on maps as the region of variable winds, viz., between 10° and 20° N. and 55° and 60° W. They take their course along the American coast, and thence sometimes follow the Gulf Stream across the ocean. They are felt usually between July and October, August being the month most subject to them. The motion in all the instances recorded in America was N. by W. and S. round to E. This indicates that as the vortex moved N. the air from that quarter rushed in, that the air from the W. and S. followed the vortex, and that as it advanced towards the N.E. the air from the E. met it, while the rotary motion was produced by the meeting at various angles of the particles of air set in motion by all these currents.

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Very destructive hurricanes and whirlwinds are recorded as having happened in September, 1821; Aug., 1830; Aug., 1831; and July and Aug., 1837. The storm of the 12th to 23rd of August is remarkable on many accounts, but chiefly from its eccentric course. It moved first from E. to W., then turned to the N.W., and then to the E. In the centre, ships were becalmed, while about 200 miles N. and N.E. other ships were thrown on their beam ends by winds successively from N.W., W., and S.W. This proves that the storm was starting from N. by W. to S. and E., while it had a progressive motion towards the N.W.

Colonel Reid has ascertained that the barometer affords within the tropics indications not only of the approach, but also of the state of a whirlwind. The column of mercury falls for a time, while the storm continues at one place, until at the centre a vortex passes over, and then rises gradually. The mercury continues depressed while the storm moves from one place to another. It does not appear, however, that this part of the subject has been sufficiently investigated to warrant any general conclusions beyond the indisputable fact that the fall of the column of mercury always precedes a storm of any kind. Scoresby states that he predicted storms seventeen out of eighteen times by consulting the barometer; and we all know how useful the barometer department of the Board of Trade, under the late Admiral Fitzroy, was in forewarning mariners about to put to sea. What is wanted is to ascertain the nature and direction of the coming storm, and that is an achievement yet reserved for the votaries of meteorological science.

It is to be noticed, too, that tornadoes generally come on in the hottest part of the year and at the greatest heat of the day, viz.; in the early part of the afternoon. In the interior of South America, they sometimes occur in the night; and the violence of a nocturnal tornado in the vast forests of Brazil is described as something in the highest degree sublime and terrible.

These general remarks enable us to identify the storm of Sunday, July 7, 1872, as a true tornado, an exact representation on a small scale of the dreadful visitations which in warmer climes wreck the largest ships, prostrate forests, tear the tops off houses, reduce large buildings to fragments, hurl upon the shore huge waves which in their retiring sweep away everything within reach, and cause terrible losses of human and animal life. In all its incidents, our little tornado, or as it is locally called "whirligig," indicates by the similarity of results the operation of the same causes.

The dimensions of this tornado—the only one which has been recorded in Herefordshire—are small indeed when compared with those already mentioned. The course so far as it can be traced by the damage wrought, is only about a mile, and the diameter of the vortex was not more than 200 feet, while its duration did not exceed five minutes. Within those brief limits of space and time, however, it wrought mischief of the same kinds as those of tropical tornados: it ruined several orchards, destroying in one of them nearly a hundred fruit trees, breaking the trees short off, and covering the ground with

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branches; it wrenched two elm trees out of the ground, and hurled them against a cottage, which was all but prostrated by the shock; it lifted a barn from the ground, hurled the roof to one side and strewed the rest of the structure in fragments about the fold yard; it blew an animal, a colt, over a hedge into a pool; and then it raged on through another orchard, where it levelled nearly all the trees, damaged two cottages with the mere edge of the vortex, and entering a fine plantation of oak trees committed havoc almost indescribable. Several trees, one of which is above fifty feet high, were wrenched out of the ground, and flung prostrate, the roots and the earth adjoining to them forming huge masses from 5ft. to 13ft. in diameter. A great number of the trees were broken off at about 6ft. from the ground, the trunks being torn and splintered through the very centre of the heartwood, which in every case was perfectly sound. Further in the wood, the trees were broken through in a similar manner at about 10ft. from the ground, and the tops had carried down with them other trees in their fall. In several cases the tree remained standing, but its branches were all wrested round and broken, as though grasped by some giant hand and violently twisted. The rotatory motion of the vortex was shown by the fallen trees and branches lying in opposite directions; and the upward course of the storm was indicated by the trees in the middle and at the north-east end of the plantation being broken at higher elevations than those at the entrance. At the upper end of the wood, the vortex had turned off at right angles, cut its way through an orchard, levelling several lofty pear trees, and then turning again had ascended, passed over the hill, and, after destroying several trees in a small gully, had passed across the valley in the direction of the Risbury ridge.

In the caprice which seemed to mark its action it was the true tornado. At Bebbury Farm it blew off the roof of the barn, which was found undamaged, while it blew the barn to pieces; it carried away the tiles from a part of a shed, but scarcely damaged the thatch upon an adjoining barn; it blew the roof off a pigstye, without injuring the animals beneath it; it prostrated the bean crop in a field, yet did no harm to the hedges which inclosed the field. In one orchard it destroyed 93 trees; in another 18; in another 2 or 3. In some cases the trees were decapitated, in others the branches blown off, in others the branches shattered but left on the tree.

In its attendant circumstances, too, this miniature tornado was a counterpart of that of the tropics. It was preceded by a week of intense heat; it occurred in the interval of two violent storms, in which the downfall of rain was enormous. As stated last week, one-third more rain fell in the two storms which preceded and followed the tornado than in an average month! These storms were accompanied by a sudden lowering of the temperature, as shown by the fall of unusually large hailstones. Then, too, the first storm began in the hottest part of the day, viz., between two and three o'clock p.m.; it was followed at about a quarter to four o'clock by the sudden lull and the whirlwind, and these were followed by a second thunder-storm. It was no doubt

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owing to the occurrence of this lull that the tremendous noise and violence of the whirlwind struck the cottagers with so much terror. One of them describes the cracking of the trees and the roaring of the wind as the most awful sounds he had ever heard, "far louder than the thunder," no doubt because it was so much nearer.

In the undulations of its course, too, this was a true tornado. It began in a hollow at Felton Court, thence passed up the hillside, fortunately missing the new church, the rectory, and the noble elms and oaks by which they are surrounded; then crossed the road into an orchard, where it did some damage; thence leaped across the intervening crops to a second orchard, thence descended the hill to Bebbury Farm; thence to a cottage; thence crossed the Bromyard road into another orchard; then took a course parallel with the road to Cornet's cottage, through the Richlands plantation, turned again to the left through another orchard, and then ascending kept parallel with the road, crossed the neighbouring hill, descended into a gully, and then ascending passed away.

A more detailed description is appended, the result of close observation.

The first place we visited was the wood or coppice of oak and ash trees, in the occupation of Mr. Phillips, of Richland, and belonging to Mrs. Penoyre. This wood is close to the turnpike-road at Cornet's-bridge, and near the cottage occupied by William Holt.

Here the whirwind was evidently at its height, for large oak trees, two feet in diameter, are broken short off near the ground; the tops of others are splintered in all directions. Others are blown down, the roots taking up large quantities of the soil in large discs thirteen feet in diameter.

Here, evidently, opposite hurricanes met, causing the whirlwind, as the trees have been blown down in different directions, which is not the case in the orchards further west.

Perhaps no meteorologic phenomena are better understood than thunder and lightning, though before electrical science had been studied by the philosophers of the last century, and the crowning experiment of Franklin performed, the phenomena of thunder and lightning were little understood. Clouds, being made up of watery vesicles are necessarily electrical conductors; and, being surrounded by the atmosphere on all sides, are necessarily insulated. One cloud we will assume to be positively electrified—that is to say, charged with positive electricity. There is not in all nature such a condition as that of independent electric excitation; in other words, there cannot be one body positively excited without the co-existence of another body negatively excited. The two clouds are mutually attracted, because opposite electricities attract each other. Hence they approach until the space of air between the two is insufficient to restrain their mutual electric tension. This condition having arrived, a charge takes place in a flash of lightning, but sound travelling at the rate of only 1,142 feet in a second, we do not hear the thunder for a certain time afterwards, in proportion to the distance the

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lightning is from us. Roughly approximating the distance an electric discharge is from us, for every five seconds between when the lightning is seen and thunder heard may be reckoned one mile.

The general direction of the storm was from N.W. by W., or in the general direction of a line drawn from Hampton Park to Morton Jeffries.

William Holt, who lives near the wood, and whose house was within the influence of the whirlwind, informs us that the noise from the thunder and the crashing of the trees was terrific, and lasted not more than two minutes. It occurred about four o'clock p.m. on Sunday, the 7th July. We are inclined to agree with him that the duration of the whirlwind was much nearer two minutes than five to fifteen minutes, as given in the newspaper reports.

There is one oak tree with a straight stem 50ft. long up to the beginning of the branches, and 6ft. 3in. in girth, and containing about 100 cubic feet of timber, thrown down at right angles to the general direction of the storm before it arrived here. In this wood the trees are thrown and twisted in every direction; large trees are twisted and rent into laths. Two or more violent storms must have met here, causing the whirlwind, so called from its rotary character. Mr. and Mrs. Holt call it by the very descriptive name of "whirligig."

Whirlwinds are usually attended with thunder, lightning, and other electrical phenomena, and they constitute the centre of an aerial commotion, all around the focus of which a profound calm prevails. This whirlwind was of large diameter, about 200 feet, a size never recorded as exceeded in this part of the world. We have every reason to think that nothing like this whirlwind has ever been observed, or at least recorded in England. The force exerted must have been most terrific, and beyond all calculation.

However, to give a rude guess to the force exerted by this whirlwind, let us compare great things to small. A horse power is equal to 66,000lbs raised one foot high. This whirlwind threw down and twisted the trees of a ten-acre coppice in two minutes, and it will be no exaggeration to state that the force that caused this was greater than could be exercised by all the locomotives in Great Britain at the same time.

We would strongly recommend the Woolhope Club to have photographs taken at once before the fallen trees and branches are removed, and we would suggest that an additional meeting of the Club to visit the place be shortly held.

We next visited an orchard belonging to Mr. H. Griffiths. Nine-tenths of the trees are blown down, and they contain more apples and pears than any trees we have seen this year. There is a pear tree down that measures 6 feet 3 inches in circumference, at 6 feet above the ground.

Mr. Sessions, who kindly gave us a good deal of information, has had his orchard entirely thrown down.

Two large trees were blown down across the cottage of Edward Chandler, without doing any very great injury except displacing some bricks in the

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chimney and some tiles in the roof. Some children's clothes hanging on a line in the house were set on fire by the electric current.

Great destruction was caused in the orchard in the occupation of Mr. Davies, of Bebbury. Three-fourths of the trees were blown down, all of fine growth, and in full bearing, and promising, what is a rare thing this year in Herefordshire, a very fine and splendid crop.

The roof of the barn in Mr. Davies's farm-yard was carried a considerable distance without a tile being removed. The other parts of the barn were blown down and completely wrecked; and what is most strange and to us unaccountable, an old wooden thatched stable near the said barn was not much injured, only a small patch of the thatch being removed.

A colt from the orchard is said to have been carried across a fence 4 feet high into a pool on the opposite side; but our opinion is that the colt got frightened from the noise of the thunder and the falling trees and jumped over or through the fence.

The beans here are thrown down, showing that the hurricane closely skimmed the ground.

The hurricane seems to have commenced in the parish of Felton. In Mr. George's orchard, at Felton Court, several large trees were thrown down, and many large limbs were broken off. In his hop-yard great damage was caused, tho hop-poles being thrown down and broken.

All persons within easy distance should examine this wonderful phenomenon, as it is a sight they will never, in all probability, have an opportunity of again seeing. No written description can give any adequate idea of the tremendous force exercised on the occasion.

The place is eight miles from Hereford, five miles from Withington station, and five miles from Dinmore station.

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The Woolhope Naturalists' Field Club.

MEETING AT FELTON.

MONDAY, JULY 29TH, 1872.

The Woolhope Naturalists' Field Club held an extra meeting on Monday, with a view of affording the members an opportunity of inspecting the scene of the destructive whirlwind at Felton and Bodenham, on Sunday, July 7, of which an elaborate description by Mr. Edmunds and Mr. Curley had been read at the meeting at Bredwardine. The morning being somewhat threatening—the threat was fulfilled by frequent heavy showers in the afternoon—there was but a small attendance. A party started from Hereford in a break at 10.30 a.m., and at Cornet's bridge were met by the Rev. H. T. Hill, and some other members, accompanied by several ladies. They visited and examined the Richlands oak plantation, the orchards of Mr. Sessions and Mr. Davies, the demolished barn at Bebbury, the damaged cottages and the orchard near to the Crozen Arms Inn, and coincided in the opinion that the spectacle was exceedingly interesting and instructive, surpassing what they had been led to expect by the description given. After the party had completed their examination they were hospitably entertained at Felton Rectory to lunch. In the course of the afternoon, the Rev. H. T. Hill expressed the great gratification which he felt at the visit of the club, and his hope that they had been interested in the very remarkable spectacle which they had examined. He then gave the toast of "Prosperity to the Woolhope Naturalists' Field Club," which was received with applause. Mr. Flavell Edmunds, having been called upon by the Vice-Presidents, returned thanks on behalf of the members for the great kindness shown to them by Mr. and Mrs. Hill (applause). He briefly alluded to the most interesting example of the working of natural forces which they had that day examined, and added his hope that if there should ever happen to be another such whirlwind in that district—which for the sake of the owners of oak woods and the cultivators of orchards he hoped would not soon happen—they might, if spared to visit the scene, be received with the same kind and thoughtful hospitality which had been shown to them that day. He then gave the health of Mrs. Hill, with the thanks of the Club for the trouble she had taken to entertain them (applause). The Rev. H. T. Hill neatly returned thanks on behalf of Mrs. Hill; and the party then broke up. Those who

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returned to Hereford stopped on their way to visit the magnificent oak at Rosemaund, which they found to be still flourishing, although quite hollow. Ten people could stand inside the trunk. At four feet from the ground it measured 35 feet in girth.

On the way back to Hereford, the intense blackness of the clouds to the S.W. was an omen which was soon verified by a heavy fall of rain. From Ross, Mr. Henry Southall reports that the downpour was the heaviest experienced this season. In Hereford it was not nearly so heavy as that of the whirlwind day, July 7.

At 5 p.m. a party of the members dined together at the Green Dragon hotel, Mr. E. Y. Steele, the President, occupying the chair. The Chairman apologised for his absence from the morning meeting, adding that he had been further delayed by the interruption caused by the sad accident at the Redhill junction. The party broke up about 7 p.m., several of the members visiting the terrible scene at Redhill.

The party present in the course of the day included Mr. E. Y. Steele, President; Mr. John Lloyd and Mr. Curley, Vice-Presidents; Rev. H. T. Hill, Rev. —— Graham; Mr. and Miss Hereford, Sufton; Mr. John Lamb, Mr. Flavell Edmunds, Mr. H. Southall, Mr. Garrold, Mr. Harrison, Mr., Mrs., and Miss Pitt, Mr. Paris, Mr. and Mrs. Adams, Mr. Burlingham, Mr. Riddle, Mr. Lloyd, &c.

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THE FUNGUS FORAYS OF THE WOOLHOPE CLUB, OCTOBER, 1872, WITH A LIST OF THE FUNGUSES FOUND.

By. Dr. BULL.

The low temperature and almost continuous rain of the summer and autumn of 1872 was evidently most unfavourable to Mycelium growth, and the Fungus season has therefore been very unproductive. The absence of the many kinds of Boletus and different species of Agarics which usually abound in our woods and fields all through the autumn was very remarkable, and for once in a way, by the loss of their mushrooms, the public in general could sympathise with the botanists. Science, however, did not require much sympathy, as will be seen from the list of the funguses found in the forays of the Club. The names of many which are generally abundant are not there, but their place is supplied by others, which are either very rare or altogether new to this county; thus a very bad season may really be said to have been prolific in new species. It will be interesting to make a few comments on the more remarkable species as an introduction to the list of names.

Agaricus (Tricholoma) *resplendens*, Fr., which is characterised by the delicate purity of its white structure. It was unknown in England until the present season, and yet it has appeared simultaneously in Essex, Middlesex, and Berkshire, as well as in this county. In Herefordshire it was found in some abundance on the Downton Slopes, and more sparsely at Vennwood.

Ag. (Tricholoma) *sejunctus*, *Sow.*, has been observed in Herefordshire for the first time this year. Its white gills and yellowish tint and the pale amber streaks which pleasantly variegate its homely coat of gray, make it a striking plant that readily attracts the eye.

Ag. (Tricholoma) *sulfureus*, Bull. is a local plant. Its pervading yellow colour makes it interesting, but the disgusting odour of coal liquor it diffuses renders it less acceptable than other varieties. It was rather plentiful at Vennwood, and was found also at Whitfield.

The season seems to have been very favourable to the Fir-cone Boletus, *Strobilomyces strobilaceus*, Berk., and many fine specimens were gathered by Mr. Renny on the Downton Slopes, and distributed, to the great joy of mycologists, all over the country.

The rare and local *Boletus felleus*, Bull. was found under the drip of an oak tree in the Vennwood grounds, and has been observed to grow there regularly for the last five years.

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Ag. (Collybia) *atratus*, Fr., in companionship with *Cantharellus radicosus*, B. and Br., has been found for two seasons in the charking places in Merryhill copse. Though very distinct, they yet singularly resemble each other in general aspect—a fungological parallel to those more frequent resemblances in insect life between some different species of Dipteræ and Hymenopteræ.

Ag. (Collybia) *tuberosus*, Bull. an elegant little agaric, with a regularity of contour and fineness of gill-engraving almost unique. It was found in considerable abundance in Brockhall copse. Its curious mode of growth from a tuber or selerotium, as it is called, gives it a peculiar interest. These tubers are supposed to consist of a concretion of mycelium, formed when the spores fall on a decaying fungus, Russula, Lactarius, &c., in a previous season. Their life history seems to call for further study.

Ag. (Mycena) *rosellus*, Fr., a small but especially beautiful agaric, was found this year in Dinedor fir wood for the first time. It must be rare, or it would be more frequently found, since its clear rose colour at once attracts attention. Another Dinedor plant which seems to like a damp season was Ag. (Pholiota) radicosus, Fr., for it was much more abundant this year than last.

Ag. (Naucoria) *cucumis*, P., a very local plant, was found on the railway bank in Rotherwas Wood. Its odour here is certainly strong, but it resembles rather train oil, rancid fish, or the smell of a blown-out tallow candle, than the pleasant refreshing odour of cucumber, from which it has received its specific name.

Herefordshire has also produced this season a most striking novelty in *Cortinarius cinnabarinus*, Fr., which was found by Mr. Renny growing very freely at Downton. It is a small agaric growing singly, or in crowded clusters, but its tint is so gorgeous and refulgent as to defy water-colours to reproduce—the most luminous scarlet-vermillion pales before it. It is beyond question the most brilliant addition of the year to the British Mycological Flora.

Thelephora Sowerbei, Berk., a plant which has not been found for some quarter of a century, has appeared this year in two distant parts of the county—at Vennwood and at Whitfield. It was sent to the South Kensington Exhibition, and created much interest there.

Gomphidius maculatus, Fr., is also a new addition to the British Flora from Herefordshire. It was found by Mrs. Cooper Key on the lawn at the Rectory, Stretton Sugwas, near Hereford. It is curious that this graceful plant was figured in Mr. Berkeley's "Outlines of British Fungi" by mistake, as he afterwards found out, and therefore its discovery at Stretton for the first time makes it undoubtedly British.

Sistotrema confluens, Fr., a plant so rare that few British botanists have seen it in a fresh condition, was found at Vennwood. It is perhaps more to be valued for its rarity than for its beauty, and all the rain that fell could

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not damp the pleasure of its discovery. *Peziza cupularis*, L., and the rare *Peziza succosa*, Berk., were also found in Vennwood on the same day.

Another find, and of a species altogether new, was *Hygrophorus Houghtoni*, Berk. This plant was first found this autumn by the Rev. William Houghton, M.A., on the Wrekin, and named after its discoverer by Mr. Berkeley. This agaric has also appeared suddenly in several places at the same time, viz., in North Wales, on the Blorenge at Abergavenny, and also on Dinedor Common, near Hereford.

There is still one other addition that Herefordshire makes this year to the British Flora, and that is *Ag.* (Pholiota) *Aureus*, Fr.. and it is the grandest of all. As Cortinarius cinnabarinus is the most brilliant, so Ag. Aureus is certainly the most noble plant. It was found by Mr. Renny in a fir-wood near the Roman Catholic Church at Clehonger, near Hereford, growing in two grand groups, each consisting of four or five plants. The largest agaric was nearly a foot high, and measured 11 inches across the pileus. Its colour was a golden buff with a soft rich tone over it. The ring was large, mealy, and striated, enveloping a very thick and beautifully granulated and tuberculated stem. The groups were growing in long grass on a stiff clay soil in a hollow space left by the removal of a tree, and near some fine young Deodar cedars. This plant is so distinct from the continental varieties of Aureus that it has been named *var Herefordensis*.

Close by and almost underneath these fine plants was also found the very interesting agaric, *Ag.* (Collybia) *cirrhatus*, Schum. This delicate little fungus is also very rare, and with the exception of Mr. Berkeley and Mr. Worthington G. Smith, none of our English fungologists have met with it. It is similar in habit to *Ag.* (Collybia) *tuberosus* already named, and like it, grows from a selerotium. They are, however, very distinct plants. Tuberosus is more umbonate and altogether more graceful in form, more firm in texture, and springs from a narrow oblong tuber, which has a thick dark brown cuticle. The pileus of *Cirrhatus* is more fragile, striate, and umbilicate when fully expanded. It springs from a tuber more irregular in shape, nodular, rounded, and pale yellow in colour. These, too, were buried nearly half an inch in the stiff clay soil. The stem of *Cirrhatus*, too, throws out strong fibrous rootlets on all sides, which is not the case with tuberosus.

There are some other agarics that might also be mentioned, as the rare sessile *Marasmius spodoleucus*, B. and Br., found in some abundance on a lifeless pollard Ash in Rotherwas Wood; *Ag.* (*Pholiota*) *Leveillianus*, D. and M., found by Mr. Renny on Church Hill, Leintwardine; but enough has been said to prove that the following list is an interesting one, and that the Woolhope Forays of 1872, if made under difficulties, were yet singularly successful.

AMANITA.

Ag. vaginatus, *Bull.*
,, Ceciliæ, *B. & Br.*
Ag. phalloides, *Fr.*
,, muscarius, *L.*
,, rubesceus, *P.*

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DESCRIPTION OF PLATE.

Fig. 1—3.—*AGARICUS (PHOLIOTA) AUREUS, Matt. Var. HEREFORDENSIS, Renny.*

Pileus fleshy: hemispherical, then expanded, obtuse, *rather velvet like*, pulverulent, or obsoletely squamulose, *golden tawny*. Stem stuffed, subequal, smooth. Gills adnexed, ventricose. (Often confused with *Ag. Spectabilis).*

The variety *Ag. Vahlii* has a smooth glabrous pileus with gills almost free. It is a rare and beautiful plant, adds Fries, growing on rich grassy soil. Its flesh moderately thin, at first white, then somewhat yellow. It scatters spores most abundantly, and the distant ring and top of the stem become covered with the dust. I have once seen it like a ball glued to the ground by its mycelium. The ring is variable, large, and marked with lines radiating, and veinlike. Fries "Epicrisis." Edit. alt. p. 214. No. 784.

The variety *AGARICUS HEREFORDENSIS*, here figured, differs from the above description by well marked characters, though no doubt can exist that it must be referred to the species *AUREUS*. It approaches nearer to the variety *Vahlii* than to the typical description by Fries. In the first edition of the "Epicrisis" *Ag. Vahlii* was considered as a distinct species, but Fries has been since led to consider it a variety of *Aureus*, by finding many specimens having intermediate characters.

AGARICUS HEREFORDENSIS, has a pileus constantly smooth and though with a dry and non-reflecting surface it can scarcely be called pulverulent. The stem is smooth, or slightly pulverulent above the ring and paler, but from the laciniate margin of the ring downwards, in verticle lines almost reaching to the base, it is marked by numerous small tubercles, somewhat prominent, and of a strong rufous golden tinge. The stem enlarges downwards, and has commonly a more or less bulbous outline at the base. The ring is very large and spreading. The gills are numerous, of a full yellow when young, and finally of the rich tawny colour of the pileus. The substance of the whole plant was soft and spongy when compressed, but at the same time elastic and firm. From the absence of juice the plant suffered little decay for days after it was gathered.

The specimen figured formed part of a noble group of seven or eight plants, varying in size, found by Mr. Renny growing in a plantation of Deodar Cedars near the Roman Catholic Cathedral of Belmont, near Hereford, in November, 1872. There were two or three other clusters and a few isolated plants, in all about 20 specimens within a diameter of as many yards. It is certainly one of the largest and most handsome of Agarics, and one plant found had a pileus 8 inches in diameter supported on a stem 13 inches high.

Fig. 4—9.—*AG. (COLLYBIA) CIRRHATUS, Schum.*

See Cooke's "Handbook of British Fungi." Vol. 1, p. 57. No. 149; and Fries "Epicrisis." Edit. alt. p. 119. No. 375.

Many specimens of this elegant little Fungus were found growing in the immediate neighbourhood of the large group of *Ag. Herefordensis* just described, and by their very presence lead to the inference that this latter plant had been growing there the previous year if it had been searched for.

AGARICUS CIRRHATUS is certainly very rare in Herefordshire.

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H G. Bull, del. W.G Smith, lith. Vincent Brooks Day & Son, Im

1._3. Agaricus (Pholiota) aureus. Matt. (Var. Herefordensis. Renny.)
4._9. Agaricus (Collybia) cirrhatus. Schum.

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LEPIOTA.

Agaricus procerus, *Scop.*
,, holosericeus, *Fr.*
,, naucinus, *Fr.* (Lugwardine).
,, granulosus, *Batsch.* (Dinedor)

ARMILLARIA.

Agaricus melleus, *Vahl.*
,, mucidus, *Fr.* (Dinmore, Whitfield).

TRICHOLOMA.

Agaricus sejunctus, *Sow.* (Vennwood and Whitfield).
,, albo-brunneus, *P.* (Dinmore).
,, rutilans, *Schæff.*
,, murinaceus, *Bull.*
,, terreus, *Schæff.*
,, saponaceus, *Fr.*
,, sulfureus, *Bull.* (Vennwood and Dinedor).
,, grammopodius, *Bull.*
,, humilis, *Fr.*
,, subpulverulentus, *Pers.* (Merryhill Common).
,, resplendens, *Fr.* (Vennwood and Downton Slopes).

CLITOCYBE.

Agaricus nebularis, *Batsch.*
,, odorus, *Bull.*
,, cerussatus, *Fr.*
,, dealbatus, *P.*
,, fumosus, *P.*
,, giganteus, *Fr.*
,, infundibuliformis, *Schæff.*
,, geotrupus, *Bull.*
,, flaccidus, *Sow.* (Dinedor and Mynde Park.)
,, brumalis, *Fr.*
,, laccatus, *Scop.*

COLLYBIA.

Agaricus radicatus, *Relh.*
,, fusipes, *Bull.*
,, butyraceus, *Bull.*
Agaricus conigenus, *P.*
,, cirrhatus, *Schum.* (Belmont Pro-Cathedral firs).
,, tuberosus, *Bull* (Brockhall Copse).
,, dryophilus, *Bull.*
,, atratus, *Fr.* (Merryhill charking places).

MYCENA.

Agaricus rosellus, *Fr.* (Dinedor fir-wood).
,, purus, *P.*
,, polygrammus, *Bull.*
,, alcalinus, *Fr.*
,, epipterygius, *Scop.*

PLUTEUS.

Agaricus cervinus, *Schæff.*

ENTOLOMA.

Agaricus sinuatus, *Fr.*
,, Bloxami, *B. & Br.* (Deerfold Forest and Rotherwas).
,, jubatus, *Fr.* (Haywood Forest).
,, nidorosus, *Fr.*

CLITOPILUS.

Agaricus orcella, *Scop.*

NOLANEA.

Agaricus pascuus, *P.*

PHOLIOTA.

Agaricus radicosus, *Bull* (Dinedor).
,, squarrosus, *Müll.*
,, spectabilis, *Fr.*
,, Leveillianus, *D. and M.* (Downton grounds).
,, aureus, *Fr. var Herefordensis*
,, mutabilis *Schæff.* (Belmont Pro-Cathedral fir-wood).
,, marginatus, *Batsch.*

HEBELOMA.

Agaricus pyriodorus, *P.* (Downton grounds).

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Agaricus rimosus, *Bull.*
,, fastibilis, *Fr.* (Rotherwas wood).

FLAMMULA.
Agaricus carbonarius, *Fr.* (charking places everywhere).

NAUCORIA.
Agaricus cucumis, *P.* (Rotherwas wood).
,, semiorbicularis, *Bull.*

PSALLIOTA.
Agaricus campestris, *L.*
,, arvensis, *Schæff.*

STROPHARIA.
Agaricus æruginosus, *Curt.*
,, obturatus, *Fr.* (Brockhall Copse).
,, melaspermus, *Bull* (Croft Ambury).
,, squamosus, *Fr.*
,, semiglobatus, *Batsch.*

HYPHOLOMA.
Agaricus sublateritius, *Fr.*
,, capnoides, *Fr.* (Dinedor firwood).
,, fascicularis, *Hud.*
,, lacrymabundus, *Fr.*

PSILOCYBE.
Agaricus sublanceatus, *Fr.*
,, spadiceus, *Schæff.*

PANÆOLUS.
Agaricus fimiputris, *Bull.*

PSATHYRELLA.
Agaricus disseminatus, *Fr.*

COPRINUS.
Coprinus comatus, *Fr.*
,, atramentarius, *Fr.*
,, picaceus, *Fr.* (Haywood and Deerfold forests).

CORTINARIUS.
Cort. (Phlegmacium) callochrous, *Fr.*
,, ,, fulgens, *Fr.* (Vennwood and Downton grounds).
,, (Myxacium) collinitus, *Fr.*
,, (Inoloma) violaceus, *Fr.* (Leintwardine).
,, (Dermocybe) caninus, *Fr.*
,, ,, cinnabarinus, *Fr.* (Downton grounds).
,, ,, cinnamomeus, *Fr.*

LEPISTA.
Lepista nuda, *Fr.*
,, personata, *Fr.*

HYGROPHORUS.
Hygrophorus eburneus, *Fr.*
,, cossus, *Fr.* (Dinmere).
,, olivaceo-albus, *Fr.* (Church-hill, Leintwardine).
,, hypothejus, *Fr.* (Merryhill Common).
,, pratensis, *Fr.*
,, virgineus, *Fr.*
,, ceraceus, *Fr.*
,, coccineus, *Fr.*
,, obrusseus, *Fr.*
,, conicus, *Fr.*
,, psittacinus, *Fr.*
,, calyptræformis, *B. & Br.* (Whitfield and Holm Lacey Park).
,, murinaceus, *Fr.*
,, Houghtoni, *Berk.* (Dinedor Common).

GOMPHIDIUS.
Gomphidius glutinosus, *Fr.*
,, maculatus, *Fr.* (Homefield, at the Rectory, Stretton Sugwas.

LACTARIUS.
Lactarius torminosus, *Fr.* (Dinmere and Whitfield).

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Lactarius controversus, *Pers.*
,, blennius, *Fr.*
,, insulsus, *Fr.*
,, vellereus, *Fr.*
,, deliciosus, *Fr.*
,, glyciosmus, *Fr.*
,, pallidus, *Fr.*
,, rufus, *Fr.*
,, serifluus, *Fr.*
,, mitis, *Fr.*

RUSSULA.

Russula nigricans, *Fr.*
,, furcata, *Fr.*
,, rubra, *Fr.*
,, fœtens, *Fr.*
,, fragilis, *Fr.*

CANTHARELLUS.

Cantharellus cibarius, *Fr.*
,, infundibuliformis, *Fr.*
,, radicosus, *B. and Br.* (Merryhill charking places).
Nyctalis parasitica, *Fr.* (Rotherwas).

MARASMIUS.

Marasmius oreades, *Fr.*
,, peronatus, *Fr.*
,, spodoleucus, *B. and Br.* (Rotherwas).
,, ramealis, *Fr.*

PANUS.

Panus stypticus, *Fr.* (Rotherwas wood and Belmont).

LENZITES.

Lenzites betulina, *Fr.*

BOLETUS.

Boletus elegans, *Schum.*
,, luteus, *L.*
,, laricinus, *Berk.*
,, chrysenteron, *Fr.*
,, edulis, *Bull.* (Dinedor common).
,, scaber, *Fr.* (Haywood Forest).
,, felleus, *Bull.* (Vennwood grounds)

Strobilomyces strobilaceus, *Berk.* (Downton Slopes and Haywood Forest).

POLYPORUS.

Polyporus varius, *Fr.*
,, quercinus, *Fr.*
,, igniarius, *Fr.*
,, fomentarius, *Fr.*
,, applanatus, *Fr.* (Whitfield shrubbery).
,, versicolor, *Fr.*
,, spumeus, *Fr.*
Trametes suaveolens, *Fr.*
Hydnum repandum, *L.* (Dinedor, Haywood, Whitfield).
Fistulina hepatica, *Fr.*
Sistotrema confluens, *Fr.* (Vennwood).
Craterellus cornucopioides, *Fr.*
,, crispus, *Fr.* (Vennwood and Rotherwas).
Thelephora Sowerbei, *Berk.* (Vennwood and Whitfield).
,, laciniata, *P.*
,, sebacea, *Fr.*
Corticium quercinum, *P.*
,, nudum, *Fr.*

CLAVARIA.

Clavaria fusiformis, *Sow.*
,, inæqualis, *Müll.* (Dinedor Camp.
,, vermiculata, *Scop.*
,, pistillaris, *L.* (Rotherwas and Whitfield).
,, cinerea, *Bull.*
,, fastigiata, *D.C.*
Pistillaria puberula, *Berk.* (Haywood Forest and Rotherwas).
Bovista nigrescens, *P.*
Lycoperdon pyriforme, *Schæff.*
Seleroderma vulgare, *Fr.*
Cyathus striatus, *Hoffm.*
,, vernicosus, *D.C.*

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Helvella ephippium, *Lev.* (Rotherwas Wood).
,, crispa, *Fr.*
,, elastica, *Bull.*
Spathularia flavida, *Pers.* (Dinedor fir-wood).
Anthina flammea, *Fr.* (Whitfield).
Leotia lubrica, *Pes.* (Dinedor, Dinmore, &c.)
Geoglossum viride, *P.* (Whitfield).
,, difforme, *Fr.*

Peziza aurantia, *Fr.*
,, cupularis, *L.* (Vennwood).
,, succosa, *Berk.* (Vennwood)
,, hemispherica, *Wigg.*
Helotium virgultorum, *Fr.* (Vennwood)
Bulgaria sarcoides, *Fr.* (Rotherwas Wood).
Hypomyces luteo-virens, *Tul.*, on Lactarius deliciosus (Merryhill Common).

In addition to these Herefordshire Funguses, many others of great interest were brought or sent to the Exhibition. Mrs. Lloyd Wynne brought the beautiful specimen of Thelephora multizonata, *B. and Br.*, which had been exhibited at South Kensington and created so much interest there from its rarety. The Rev. James Keith, of Forres, N.B., sent by Mr. Worthington Smith a magnificent specimen of Ag. (Armillaria) aurantius, *Fr.*, quite new to Great Britain; Hydnum fragile, *Fr.*; and a Tricholoma resembling Ag. fulvellus. Fine specimens of the Polyporus annosus, *Fr.*, gathered from the timbers of the main heading of the Glyncorrwg Colliery, near Briton Ferry, at a depth of over 1,200 feet below the surface, were sent by Mr. Cordwell, and the following interesting plants were brought by those excellent fungologists Messrs. Broome, Houghton, Worthington G. Smith, Plowright, and Phillips:—

Ag. (Pholista) adiposus, *Fr.*
Polyporus intybaceus, *Fr.*
,, elegans, *Fr.*
,, Stephensii, *B. and Br.*

Clavaria cristata, *Holmsk.*
,, formosa, *Bull.*
,, rugosa, *Pers.*
Hypoxylon coccineum, *Bull.*
Xylaria hypoxylon, *Grev.*

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DESCRIPTION OF PLATE.

No. 1—4.—*HYGROPHORUS FORNICATUS. Fr.*

Pileus, fleshy white, thin, at first bell shaped then expanded, *smooth, glabrous*, viscid; stem firm, equal, tough, glabrous; gills. white, thick, distant ventricose, *sinuately adnexed.* In mossy meadows, rare; gathered in Fennia by Karsten and in Switzerland by Trog. It has the texture and habit of *Hygrophorus russo-coriaceus* but differs in the attachment of the gills. Stem solid below, hollow above, three inches long and four lines thick: Pileus obsoletely umbonate, sub-repand, white, or pale livid: Gills sometimes free with a decurrent tooth. Fries "Epicrisis." Ed. alt. p. 414. No. 36.

This plant was found in England for the first time in Holme Lacey Park near Hereford, October, 1873, on the Fungus Foray of the Woolhope Naturalists Field Club.

No. 5.—*CLAVARIA CURTA. Fr.*

Very small, branched, in thick cluster, *yellowish-green;* stem, none; branches short, *dense* and *obtuse.* It grows on dry hills clothed with short grass. It differs from *Clavaria muscoides* in stature and colour. Fries "Epicrisis." Ed. alt. p. 668. No. 7.

It was found in Herefordshire on Moccas Lawn, October, 1873.

No. 6—7.—*CLAVARIA RUFA. Fr.*

Caspitose, *red.* Clubs solid, sub-bifid acute. In grassy places in Denmark (lately gathered by no one and hence a doubtful species). Fries "Epicrisis." Edit. alt. p. 674. No. 43.

Gathered in Holme Lacey Park, Herefordshire, October, 1873.

No. 8—11.—*AGARICUS (NOLANEA) ICTERINUS. Fr.*

Pileus rather membranaceous, bell-shaped and convex, slightly striated, *covered with papillæ*, of a greenish-yellow and hygrophanus: stem somewhat solid, short, and rigid, *covered with light floury dust.* Gills adnexed or free, pallid, distant, ventricose. On garden lawns it grows in small groups, in woods solitary. A very common species, most distinct but changeable in form, small, never truly umbonate. The papillæ are often evanescent when the pileus is covered with superficial flocculent particles (flocci). Colour yellow or yellowish green. The stem and papillæ become brown, and when rotten a deep yellow. Fries "Epicrisis." Edit. alt. p. 209. No. 758.

This agaric seems to be very rare in England, and was found for the first time at Holme Lacey Park, Herefordshire, October, 1873, and at Chatsworth, Derbyshire, the same year, by Mr. Renny.

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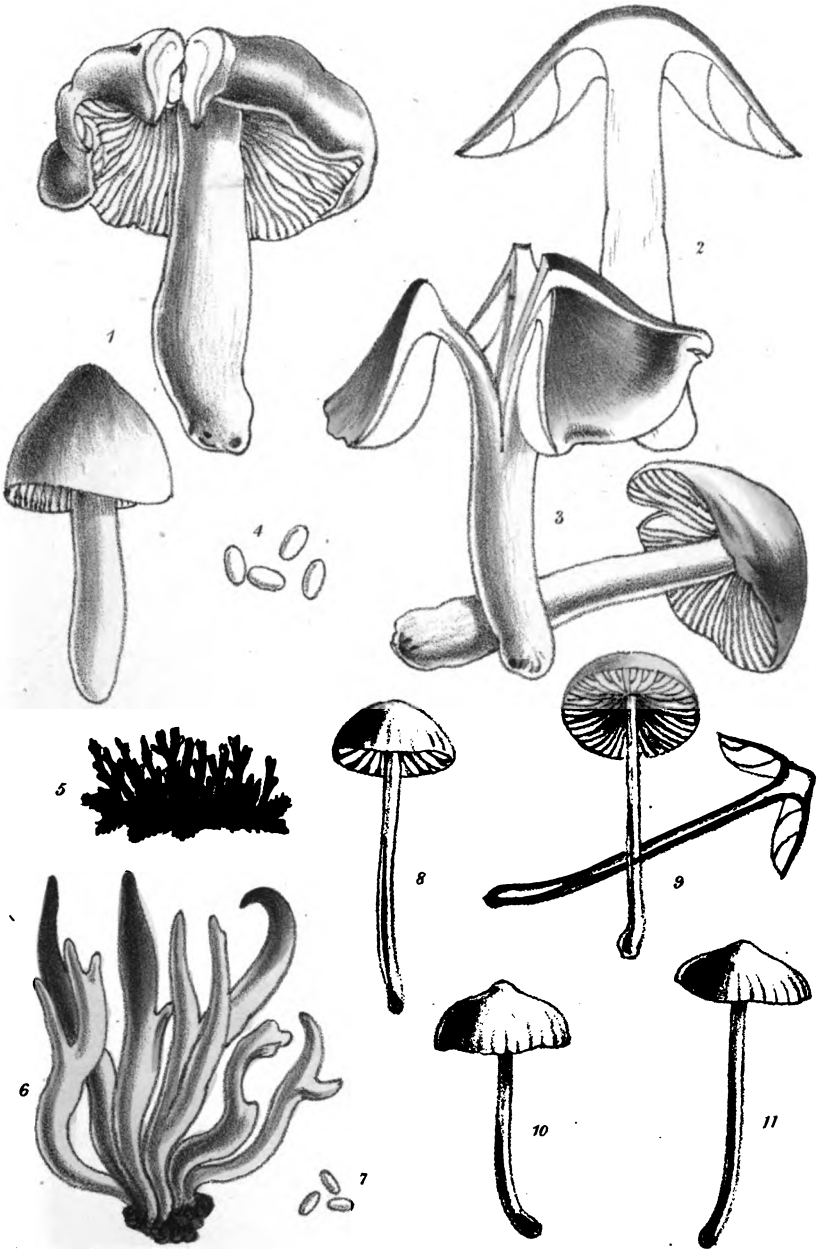

W. G. Smith, del. et lith. Vincent Brooks Day & Son Imp

1–4. Hygrophorus fornicatus Fr.
5. Clavaria curta Fr. 6.7. C. rufa. Fr.
8–11. Agaricus (Nolanea) icterinus. Fr.

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PONTYPOOL AND ITS MANUFACTURES AND COAL FIELDS.

By WILLIAM ADAMS, Esq.

We are now assembled for the second time in the good old town of Pontypool, which is about the most easterly point of the South Wales Coalfield, and very near the base of the carboniferous formation; a little still east of us is the Old Red or Devonian, followed by the Upper Silurian.

Several members present will remember a most agreeable first meeting of the Club held here June 19th, 1868, when several valuable papers were read—one being by G. Phillips Bevan, Esq., F.G.S., on the South Wales Coalfield.

At the request of our President, I desire to-day to present to you some notes upon Pontypool, or Pont-ap-Howell, which long ago was a town of note, famous for its "Japan ware" manufacture; its tin-plate, wire, and iron-works, and also for "fairy lore," the latter from the pen of the Rev. Edmund Jones, of The Tranch, a spot within sight of the place in which we are now assembled, and which was published in 1779.

In 1798, the Rev. William Coxe, A.M., F.R.S., F.A.S., in his "History of Monmouthshire," vol. 2, p. 233, says:—

"Pontypool is a large, straggling place, containing 250 houses and 1,500 souls. The place is the principal mart for the natives of the mountainous district, and the weekly market is not the least considerable, and the cheapest in Monmouthshire.

. . . . . .

"The town principally owes its foundation and increase to the ironworks established by the family of Hanbury; it is likewise remarkable for the Japan manufacture, known by the name of Pontypool ware. In the reign of Charles II. Thomas Allgood, a native of Northamptonshire, came in 1670 to Pont-y-pool, and, being a man of projecting genius, made various experiments to extract copperas and oil from coal, and finally invented the method of lackering iron plates with a brilliant varnish, in the same manner as the Japanese lackered wood, which was afterwards distinguished by the name of Pontypool ware.

"He was succeeded by his son Edward, who was principal agent of Major Hanbury, and assisted him in directing and improving the ironworks, particularly the wire manufactory, which was deficient in the method of polishing to that established at Woburn in Bedfordshire. For the purpose of discovering the secret, Edward Allgood repaired to Woburn in the character of a beggar, and, acting the part of a buffoon, gradually obtained access to the workshops, and was permitted to inspect the various processes, by which

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means he acquired the art of making the leys, the principal ingredient for giving a more brilliant polish to the iron-wire, which was the only desideratum in the Pontypool works.

"Pontypool is in the Manor of Llantarnam, and the town-house was erected in 1730 by Mrs. Bray, joint lady of the manor with her sister Miss Morgan.

"The family of Hanbury, to whom the town owes its consequence and celebrity, have long resided at Pontypool Park, in the vicinity. Their ancestors were formerly seated at Hanbury Hall in Worcestershire, from which place they derived their name. According to the Red Book of the Bishopric of Worcester, Roger de Hanbury was born there in 1125, and his descendant Galfridus resided there in the middle of the 16th century. About the year 1500 the possessor disinherited his brothers, and left the seat and part of the estate to a natural daughter. Richard, the eldest, settled in London, and is distinguished as one of the Goldsmith's Company (for so the bankers were called) in the reign of Henry VII.; his eldest son, Capel, purchased an estate at Pontypool, and was the first founder of the ironworks. The carliest conveyance deeds are dated 1565, and a regular account of the sale of iron commences in 1588.

"Capel died in 1704, and was buried in the chancel of Kidderminster Church under a flat sepulchral stone.

"His eldest son and heir, John, usually known by the name of Major Hanbury, was born in 1664; after receiving a liberal education, and making a considerable proficiency in classical literature, he chose the profession of the law. He did not, however, long pursue his studies in this line. He said one day to Mr. Jones, of Llanarth, 'I read Coke upon Littleton as far as Tenant in Dower, but, on the suggestion of a friend that I should gain more advantage from the ironworks of Pontypool than from the profits of the Bar, I laid aside Tenant in Dower and turned my attention to mines and forges.'

"In 1701 he married Albina Selwyn, of Matson, county of Gloucester, with whom he obtained a considerable fortune.

"He was determined to still further improve the ironworks at Pontypool, near which he built a house and fixed his residence.

"His skill and indefatigable application was crowned with considerable success; he increased the produce of the ironworks, made many improvements in the machinery, invented the means of rolling iron plates by means of cylinders, and introduced the art of tinning into England; and black plate was first made here.

"He died in 1734 in the 70th year of his age."

For the meteorologists of the Club it may be mentioned there is a record of a hail storm falling in Pontypool 160 years ago, or in 1712, which it is said "Extended about one mile, and lasted nearly half an hour, broke down wheat stalks, and ruined as much glass at Major Hanbury's house as cost £4 the repairing. The hail-stones were 8 inches in length!!"

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The members may consider themselves very fortunate in not being at Pontypool on such a day.

In 1798 Capel Hanbury, the proprietor of the Pontypool estates, took the name of Leigh in consequence of the will of the late Lord Leigh.

Mrs. Leigh was the widow of the late Sir Robert Humphrey Mackworth, of Gnoll Castle, Neath.

In 1799 Pontypool had its theatre, and on December 8th an address was given to the inhabitants by Mr. Thomas Thomas "On the rise and progress of the iron works in that town and its vicinity," a copy of which was given to me by the late Mr. William Llewellin of Glanwern.

With your permission I will now make a few remarks upon the South Wales Coal-field in which we to-day hold our meeting, and to illustrate which I ask your attention to the Ordnance Geological Survey Map and Sections which are placed upon the walls, and also to a longtitudinal section of the minerals on the South crop near Caerphilly. as proved by the tunnel of the new Rhymney railway, which is kindly lent me for our use to-day by Mr. Cornelius Lundie, C.E., the engineer of the railway.

The tunnel has passed through nearly the whole of the coal measures of the eastern part of the coal field, the mill-stone grit, carboniferous or mountain limestone, and some depth into the old red sandstone or Devonian formation. The dip of the strata here is towards the north at various angles from 30 to 49 degrees.

This coal field had very early attention given to it, first by Mr. George Owen of Steallys, Pembrokeshire, who wrote an essay on the basin in 1570, having examined its north and south outcrops at the junction with the limestones, and extending throughout its entire length over 100 miles.

He mentions two descriptions of coals which he calls the "stone coal" and "ring" or "running coal," and describes the mode of mining at that time.

This paper was not published until the year 1796, when it appeared in the Cambrian Register, communicated by his grandson, Mr. Richard Fenton.

I have in my possession, and now exhibit to members. a letter from Sir Richard C. Hoare, Bart., who was a companion of the Rev. Mr. Coxe in the commencement of his tour in Monmouthshire, written to Richard Fenton, Esq., Fishguard, Pembrokeshire, as follows:—

"Dear Sir,—I beg your acceptance of our Tour in Monmouthshire, and hope you will like its plan and style. The modern style of *Tour-writing* is really dreadful, and the generality of *County Histories* are so *dry* that they may be considered more as *Books of Reference* than of amusement; it has always been my opinion that something between the two was the happy medium—History and Anecdotes judiciously blended with local descriptions of scenery, &c., and I think my friend Coxe has been very happy in this particular. The puzzles are not yet ready. Let me hear of the safe arrival of my packet.

Yours Sincerely,

26th November, 1802. RICHARD HOARE."

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The next writer we find is Edward Lloyd, and one of our earliest geologists, who visited this town and neighbourhood and appears to have been the first who noticed the Stigmaria ficoides in the South Welsh and Monmouthshire coal district, and describes it in a letter to Dr. Tancred Robinson dated Usk, 15th June, 1697 (published in the Philosophical Transactions 1712, vol. 27, page 467). He also gives an account of a coal level, and the mode of working adopted at that time—this was at Llan Elhi (Llanelly), Breconshire, and he states that the roof above the coal was slate, and contained many stalks of plants, which he did not save because it seemed impossible to reduce them to their several species, and noticing the coal and iron mines then at work at Pontypool (p. 468) he mentions leaves of "capillary plants" in the iron ore.

Again, we have a description of the basin by Mr. Edward Martin, read before the Royal Society 22nd May, 1806.

Next Dr. Buckland, and the Rev. W. D. Coneybeare (afterwards Dean of Llandaff) in 1822, in a paper entitled Observations on the South Western district of England, "Geological Transactions," vol. 1 part 2, second series, pointed out the connection of the coal districts of Somerset, Gloucestershire, Monmouthshire, and Glamorganshire, followed by a paper by Mr. Francis Forster, Observations on the South Welsh Coal Basin, read June 15th, 1830, before the Natural History Society of Northumberland and Durham.

In 1833 Mr. Robert Bakewell, in his work on Geology, describes the field.

In 1846, vol. 1 of the "Memoirs of the Geological Survey of Great Britain" was published containing a lengthy and well-written paper by Sir Henry T. De la Beche on the formation of the Rocks of South Wales and South-Western England.

In 1860 a carefully-prepared paper on the field was published by the Hon. Member for Glamorganshire, Mr. H. Hussey Vivian.

Mr. Hull, in 1861, gives a chapter on the Great Coalfield of South Wales in his work "The Coal Fields of Great Britain," and numerous other writers have drawn attention to the district, so that but little more remains to be said upon the subject.

The extent of the South Wales Coal Field (that is of the coal-producing strata) is from Blaenafon and Pontypool on the Eastern outcrop to St. Bride's Bay, Pembrokeshire, on the west, a length of about ninety miles; the width varying from the north to the south outcrop, say in Monmouthshire and Glamorganshire up to the river Loughor (the county boundary with Caermarthenshire) about sixteen miles (in this is included the small area lying in Breconshire); from Loughor river to Kidwelly and Caermarthen Bay about ten miles; under the Bay to Saundersfoot, about 5 miles; and from Saundersfoot through Pembrokeshire to St. Bride's Bay, an average width of four miles.

The superficial area is differently estimated by the various writers, the lowest being Mr. Hull, who gives it at 906 square miles or 579,840 acres; another, 935 square miles or 598,400 acres; another, 960 square miles or 614,400 acres;

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another, 1,000 square miles or 640,000 acres; another, 1,045 square miles or 668,800 acres; another, 1,093¾ square miles or 700,000 acres; another, 1,200 square miles or 768,000 acres. Therefore we may fairly take 937½ square miles or 600,000 acres to represent the area of the field, and the quantity of unworked coal, as published by the Royal Coal Commissioners was in January, 1871, 36,566,195,917 tons.

The coals at the eastern end of the basin are chiefly bituminous and make a very superior coke, and continuing so to Rhymney, between which and Dowlais a slight change takes place, becoming free burning, and this becomes greater at Cyfarthfa, where the anthracitic appearances begin to be fairly developed as pointed out by the late Mr. David Mushet. This same quality continues through the Hirwaun Common, the head of the Neath Valley, across to Ynyscedwin in the Swansea Valley, the Twrch Valley, and thence to Mynydd Mawr and the Gwendraeth. At the two latter places perhaps the purest quality, anthracite (Kilgetty in Pembrokeshire excepted) is now being worked for hop and malt drying, distillery purposes, &c.

The position of the well known steam coals of Merthyr, Aberdare, and Rhondda will be observed on referring to the names of the places on a map of the district, and the relative position of the seams on the section.

The Llynfi Valley, all the South crop, and westwards to Caermarthen Bay, may be considered as more or less bituminous and free burning, and Pembrokeshire as anthracitic.

The argillaceous ironstones are very abundant and good, and are interstratified with the coal measures, the aggregate thickness varying from 60 to 70 inches and upwards, and until about thirty years ago comparatively no other iron ore was used in making foundry pig and bars and rails, equal perhaps to any in the world.

On the 22nd of March, 1828, permission was granted by the Earl of Plymouth's agent, Mr. Maughan, of Burnt Green House, near Birmingham, to Mr. Robert Thomas, of Waun Wyllt, near Merthyr Tydvil, to open a sale coal colliery on Waun Wyllt property.

The terms of the grant are thus expressed:—"To be limited to a sale colliery, without power to sell to any of the ironmasters, and not to interfere with works which may be erected for the smelting of the Earl of Plymouth's iron mines in that quarter." This is the colliery from which a fine specimen of Sigillaria came, which is now the property of the Baron Windsor, and was lent to the Cardiff Exhibition, 1870.

In 1836 the steam coal collieries were commenced in the Aberdare Valley by the Messrs. Wayne, and the quantity limited by the buyers Messrs. Edmund Wood and Co., of London, to two boat-loads or 44 tons per day, yet the demand gradually and ultimately rapidly increased; this, with the greatly increased make of iron, caused colliers' and ironworkers' wages to be raised in a greater ratio than the iron-stone getters, and from the time we first have a statement given in that valuable work, "Mr. Robert Hunt's Mineral Sta-

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tistics for the year 1855," when the get of argillaceous iron-stone was 1,165,500 tons, it has been yearly diminishing until in 1868 it was but 628,845 tons, the deficiency for the ironworks being drawn from other British and foreign mines.

There are other iron mines, brown hæmatites, worked at Pentyrch, Wenvoe and Mwyndy, near Llantrissaint, probably of the Permian age, and infilling hollows and fissures of the mountain limestone.

The first record of the produce of the mines is by Mr. Hunt: in 1857, 24,300 tons; in 1868, 83,835 tons; in 1871, 83,324 tons.

The Mwyndy mines were worked and smelted on the spot in the time of Henry VIII., and mentioned by Leland in his "Itinerary."

The pig iron made in South Wales, given in the *Edinburgh Philosophical Journal*, was in the year 1827, 272,000 tons; some other source, 1839, 453,880 tons; Mr. Robert Hunt, 1854, 750,000 tons; 1859, 985,290 tons; 1868, 894,255 tons; 1869, 839,502 tons; pig iron, 1870, 979,193 tons; 1871, 1,045,916 tons.

Coals raised: Mr. Robert Hunt, in the year 1854, 8,500,000 tons; 1868, 13,210,000 tons; 1869, 13,454,800 tons; 1870, 13,664,192 tons; 1871, 14,035,525 tons.

Great as the quantity of coal comprised within this field, yet it has been wisely ordained by Him who hath done all things well, that the valuable mineral by the deeply denuded valleys intersecting the field, some of them 800 and 1,000 feet deep, together with anticlinal lines and faults, have placed two-thirds of the coals, or that portion between the eastern outcrop at Pontypool and Blaenavon and the Vale of Neath, so that the lowest seam can be won by pits of less than 1,000 yards in depth.

West of the Vale of Neath, and on to Llanelly, in the deepest part of the basin, a greater depth will be required to reach the lower seam, but what depth I am not prepared to state; yet the day must be very distant when that will be found necessary.

The dip along the north outcrop is very moderate, ranging from 3 to 6, and in some cases 9 inches per yard; while on the south crop it varies from 9 to 12, 15, and 18 inches per yard, this gradually flattening northwards leaving a large area in the centre of the field comparatively flat, excepting where the anticlinal line disturbs the stratification, and even adjoining that the dips vary very much.

FAULTS: The most numerous in the field run from north-west to south-east, and vary in amount of vertical displacement up to 250 to 300 yards; others running in an east and west direction, the amount of displacement being in some places from 400 to 500 yards.

The greatest fault I have heard of in the field is one in Pembrokeshire which, in 1841, the late Mr. D. H. Williams, one of the officers of the Ordnance Geological Survey, wrote to me and described as being equal to 2,000 feet, or 666⅔ yards.

The deepest pits now sunk are The Abercarne (Ebbw Valley) Ebbw Vale Company, 304 yards; New Tredegar (Rhymney Valley) Powell's Duffryn

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Company, 418 yards; Ffochrhiw (Bargoed Rumny) Dowlais Company, 435 yards; Castle Pit, Cyfarthfa (Taff Valley) Robert Crawshay, Esq., 332 yard; Navigation Colliery (Aberdare) Messrs. Nixon and Co., 420 yards; Dinas Colliery (Rhondda Valley) Messrs. Coffin and Co., 403 yards; Llwyn-y-pia (Rhondda Valley) Glamorgan Coal Company, 382 yards; Blaen Rhondda (Rhondda Valley) Messrs. J. Marychurch and Co., 402 yards.

The section appended is compiled from sinkings and workings in the Taff Valley.

The upper part commences at the top of Messrs Bookers' Pentyrch, Rhyd-yr-helig Pit, which would be the highest ground geologically of any between Pontypool and the Vale of Neath, and passes through the Upper Lantwit coals until the principal seam, known as the Mynyddisllwyn or Lantwit coal, is met at a depth of 176 yards. This is a very superior coal, and the best for house and gas purposes in the field; it is worked along the high grounds near Pontypool, Blackwood, Gelligaer, Caerphilly, Rhyd-yr-helig, Lantwit Fardre, and Bettws, in the Llydfi Valley. The section then passes on through the Pennant rocks and coal—the steam and manufacturing coals, and the ironstone beds—the lower shales and Rosser veins, Farewell rock, carboniferous or mountain limestone, to the old red sandstone, which may be seen 2½ to 3 miles north of Merthyr.

Westwards of the Taff Valley the measures thicken out considerably, and eastwards from Merthyr they decrease in thickness.

	Mynydd-y-garreg, Caermarshire. Yards.	Merthyr. Yards.	Ebbw Vale. Yards.	Llanelly or Clydach. Yards.
From Mynyddisllwyn coal to bottom vein coal...	—	900	701	—
From bottom vein to top of the limestone	539	202	133	80
Thickness of limestone to top of old red sandstone	180	243	200	140

The old red sandstone. comprising the Breconshire Beacons, 10 miles north of Merthyr, Sir Roderick Murchison estimates to be 8,000 to 10,000 feet thick; and he writes, "the grandest exhibitions of the old red sandstone in England and Wales appear in the escarpments of the Black Mountain of Herefordshire, and in those of the loftiest mountains of South Wales, the Fans of Brecon and Caermarthen, the one 2860, the other 2590 feet above the sea. In no other tract of the world which I have visited is there seen such a mass of red rocks so clearly intercalated between the Silurian and the carboniferous strata."

By more recent observations the height of the Breconshire Fans above mean tide level is 2,910 feet.

The highest ground in the coal field is the Garnfach, a little south-west of Hirwaun, 1,971 feet above sea-level, as shown on the recent ordnance maps.

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A glance at the map will show that the district generally is well provided with railway accommodation connecting it with all the Bristol Channel ports and inland communication; the only people who complain are those of the Llynfi and Ogmore Valleys, who have no direct narrow guage communication with any public railway or with any port excepting Porth Cawl. Probably another year will put this right as Parliamentary powers exist for doing so.

The coal field contains some of the best beds of fire-clay known, yet it is not used as it should be; if best fire-bricks are required Stourbridge and the neighbourhood is sent to for them, and often even for building purposes; and as to gas retorts, I do not think such an article was ever made in this district.

There is a very superior silicious fire-brick made in the Neath Valley by Messrs. Frederick and Jenner, and also at Hirwaun by Messrs. N. B. Allen and Co., for roofs of reverberatory furnaces, coke ovens, &c., but from its composition, will not do where ordinary fire-brick is used.

The Coal Field contains, too, alum shales which lie unnoticed, and which can be very cheaply worked.

There is a mineral, also, in the field which has only been worked near Pontypool, and known there as the "Horn Coal," underlying the Meadow Vein Coal. It is an oil shale containing from 50 to 55 gallons of crude oil per ton of shale; by removing by distillation 12 to 15 per cent. of mineral turpentine, which is used for machinery paint and out-door iron work, a good lubricating oil is left, and by further refining, fine oil is produced; it also contains paraffine.

I have no doubt but the "Japan Ware," for which Pontypool was so celebrated years ago, obtained its celebrity from the varnish made from this oil shale.

In the year 1670, as before stated, Mr. Thomas Allgood came from Northampton to Pontypool, and introduced the manufacture of Japan ware; and the manufacture of the superior quality probably ceased about the beginning of the present century.

There were nine agencies established in October of the year 1763 for its sale :—In London, three, Mr. Gray, cutler, New Bond-street; Mr. Gibbs, Bond-street; Miss Pinchbeck, Pall Mall; in Bristol, one, Mr. Swanton, cutler, on the Quay, and nowhere else; in Bath, three, Mr. Routel, Mr. Bull, Mr. Speren; in Gloucester, one, Mr. Cowcher, Westgate-street; in Chepstow, one, Mr. Cooper. And a varnish under the name of "Pontypool Varnish" was sold in London in December, 1862.

The same character of shale exists in other parts of the field, but does not yet appear to have been noticed. The late Mr. William Llewellin, of Pontypool, just before his death, showed me a large block that had been sent to him, and he thought it came from the Taff or the Llynfi Valley, but his serious illness prevented his giving attention to it.

On reference to the Geological Map, the Farewell Rock is seen underlying the coal measures, and outcropping the whole length of the field on the

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SECTION OF

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TAFF V

Scale 180 Feet to the Inch.

18

Name of Seam	Scale Yds	Scale Ft	Strata.	Description	Thickness Ft	Thickness Ins
Top of Rhydyrhelig Pit		20				
		40		Sand, Gravel, Clay and Blue Stones	66	0
	20	60				
		80				
		100				
	40	120		Rock	102	0
		140				
		160				
RHYDYRHELIG COAL		180		COAL	3	0
	60	200		Fireclay	6	0
		220				
		240				
	80	260				
		280				
Yards		300		Bastard Fire Clay,		
100	100	320		Rock & Blue Stones	232	0
		340				
		360				
	120	380				
		400		Lancaich Black Band Ironstone 4-11 Shale 2-8½		
3 FEET COAL		420		COAL	3	0
	140	440		Fireclay	5	0
2 FEET		460		Blue Stones	76	0
		480		COAL	3	0
	160	500				
		520		Mixed Rock and Stones	72	0
4 FEET		540				
Lantrit Coal		560		COAL	4	0
	180	580		Under clay	7	0
		600				
		620				
200	200	640		Sandstone	170	0
		660				
		680				
	220	700				
PENCOEDCAE		720		COAL 1.10 Rising 0.8 COAL 1.3 Black Shale 0.4 COAL 1.0	4	11½
	240	740				
		760				
		780				
	260	800		Sandstone	165	0
		820				
		840				
	280	860				
TYDÛ COAL		880		COAL and Shale	4	6
300	300	900				
		920				
		940				
	320	960				
		980				
		1000				
	340	1020		Sandstone & Shale	296	0
		1040				
		1060				
	360	1080				
		1100				
		1120				
Nº 1 RHONDDA	380	1140		COAL	2	0
		1160				
		1180				
	400	1200				
		1220				

Name of Seam	Scale Yds	Scale Ft	Strata	Description	Thickness Ft	Thickness Ins
	420	1240				
		1260				
		1280				
	440	1300		Sandstone & Shale	108	
		1320				
		1340				
	460	1360				
		1380				
		1400				
	480	1420				
		1440				
		1460				
500		1480				
	500	1500		(Pennant Rock)		
		1520				
		1540				
	520	1560				
Nº 2 RHONDDA		1580		COAL		4
		1600		Under Clay		4
	540	1620				
		1640		Fire Clay Rock and Shale	92	
		1660				
	560	1680				
LOWER TROEDYRDIW		1700		COAL 1.3 Clod 0.4 COAL 1.1	2	
		1720				
	580	1740				
		1760		Clod Fireclay and Rock	128	
		1780				
	600	1800				
		1820		COAL		0
		1840		Shale		6
600		1860				
	620	1880				
		1900		Shale Rock and Cliff	44	
		1920				
	640	1940				
		1960		COAL		1
		1980		Fireclay		2
	660	2000				
		2020		Cliff	74	
		2040				
	680	2060		COAL		2
		2080		Fireclay		2
		2100		Hard Rock	23	
	700	2120		COAL		1
		2140		Rock and Cliff	87	
		2160		COAL		0
	720	2180		Fireclay	20	
		2200		Cliff and Rock	46	
		2220				
VOCHRHIW OR OLD MAN'S	740	2240		COAL		2
		2260		Fire Clay		3
		2280		Shale Fire Clay and Rock with thin layers of Coal	77	
	760	2300				
		2320				2
		2340		COAL		1
	780	2360		Fire Clay Shale and Rock	20	
		2380		COAL		1
		2400		Shale Cliff and Fire Clay	66	
	800	2420				2
		2440		COAL		2
		2460		Fireclay Rock & Cliff	111	
	820	2480		Rock & Shale	26	
		2500		COAL	1	
		2520		Fire Clay	6	
	840	2540		Shale	2	
		2560		COAL		
		2580		Fire Clay	16	
860		2600				
	860	2620		Rock & Shale	64	
		2640				
		2660				
	880	2680				
		2700		Fireclay Rock & Shale	28	

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)F MINERALS

'ARIOUS SINKINGS IN THE

IALLEY.

1872.

To illustrate Mr William Adams's paper.

Name of Seam	Scale Yds	Scale Ft	Strata	Description	Thickness Ft	Thickness In
				Rock and Shale	48	4
				COAL 1.4 / Clod 7.0 / COAL 1.10		
				Fireclay	6	2
				Rock and Shale	97	8
				COAL	1	4
				Fireclay with Balls of Mine	5	9
				Shale with Balls of Ironstone	12	4
				COAL	1	0
				Shale, Rock & Cliff		
				COAL 1.8 / Clod 3.6 / COAL 1.6	6	8
				Rock, Fireclay & Shale with Bed of Ironstone	62	2
				BLACK PINS.		
				COAL		
				Fireclay	8	7
				Fireclay	6	11
				Fireclay, Rock & Shale	28	7½
ELLED or 2'9 Seam				COAL	3	0
UPPER 4 FEET or Big Vein				Clod and Fireclay with Balls of Mine	22	0
				COAL	5	6
				Cliff and Shale with Balls of Mine	85	6
				COAL	2	6
				Fireclay	24	6
6 FEET or ⅞ Coal				Cliff and Clod	11	0
				COAL 0.8 / Clod 0.2 / COAL 5.6		
				Cliff & Rock with Balls of Mine	58	4
				COAL	1	8
				Rock and Cliff with Balls of Mine	79	8
				Cliff 1 8 / Coal Seaming 8 2 / Coal Fine 1 0		
9 FEET on RAS LÂ				Mine Ground with Bed of Ironstone	16	2
BRASS VEIN				COAL	2	9
				Lilly on Mine Ground	11	6
				Black Rock & Mine Ground	7	4
				COAL	1	8
				Fireclay, Cliff & Rock	24	4
				COAL	1	3
				Fireclay	3	0
				Mine Ground with Bed of Ironstone	14	7
				COAL	1	6
				Black Rock	19	8
				Fireclay 1.6 / Ground 5.6 / Coal 0.11	7	4
				Brown Tape Mine Ground with Bed of Mine	17	11
LOWER 4 FEET or Old Coal				COAL 0.9 / Clod 0.6 / Coal 2.3 / Clod 3.3 / COAL 4.0	13	6
				YELLOW VEIN IRONSTONE 5'		
				RED VEIN		
				BLACK VEIN		
				UPPER BLUE VEIN		
				LITTLE BLUE		
				YELLOW PINS		
				JENKIN PINS		
BOTTOM VEIN or Pin Garn				LUMPY VEIN		
				ROSSER VEINS		
				COAL	1	0
				Sandstone Arenaceous & Argillaceous Shales	775	4
			FAREWELL ROCK 310 0	Great Farewell Rock	310	0

Name of Seam	Scale Yds	Scale Ft	Strata	Description	Thickness Ft	Thickness In
				Conglomerate	20	0
			LIMESTONE 701. 0	Limestone	701	0
			OLD RED SANDSTONE FROM 5,000 TO 10,000 FEET THICK			

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north and east outcrops, and on the south up to Swansea Bay, with the exception of a short distance south of Llantrissaint and Waun Llanharry, where it is covered over by the later formed dolomitic conglomerate. Across the peninsula of Gower the Farewell Rock is not seen, and the coal measures appear to lie on the mountain limestone. At Tenbury it is again seen, and continues up to the Ddau-Cleddau river, west of which to St. Bride's Bay it is not again seen, igneous rocks taking its place.

The mountain or Carboniferous lime-stone is also seen surrounding the coal-field and underlying the Farewell Rock, excepting a piece near Bridgend, where it is covered by the most recently formed rock in South Wales—the Lower Lias—and again where the igneous rocks protrude in the south-west of Pembrokeshire.

In the Carboniferous lime-stone on the South Crop workings for lead have taken place at different times for a long period past. In an old lead mine at Cefnpwll-dû, near the Ruperra Castle, several Roman coins were discovered. Half a century ago lead was worked in Waun Fawr Wood, near Risca; later near Caerphilly, again on the Golden Mile, and Penlline, near Cowbridge. All these workings were in faults or fissure lines in the Mountain lime-stone which were infillings with the "vein stuff," probably of Permian or Liassic age.

Very recently I believe R. F. L. Jenner, Esq., of Wenvoe Castle, has discovered lead ore on his estate, but I expect it will be found also an "infilling" of a fault which, of course, if the fissure be wide may contain a quantity of ore.

The coal field is rich in organic remains. Although scarcely any attention has been given to them the Flora is most abundant, and is now having the attention of an eminent palæontologist. Some little notice was given to it by Lindley and Hutton in their "Fossil Flora of Great Britain, 1831-1837."

Mr. Bernard Quaritch of Piccadilly is now republishing the work; and during the year 1873 Mr. William Carruthers, F.R.S., F.L.S., F.G.S., Keeper of the Botanical Department, British Museum, will visit South Wales for the purpose of examining all the fossil plants he can meet with, and will add the fourth and supplementary volume, containing figures and descriptions of all the important additions made to the Fossil Flora of Britain since 1837, together with a critical examination of the species, in Lindley and Hutton's classic work, and a synopsis of all the known fossil plants of Britain. And I shall be much obliged by any members having fossil plants in their possession, either writing to Mr. Carruthers or to me.

The Fauna is perhaps more fully described by the late Mr. J. W. Salter in the "Memoirs of the Geological Survey," part 3, "Iron Ores of Great Britain, 1871," than any other publication we have.

Since that, in 1865, Mr. John Edward Lee, of Caerleon, met near Llantrissaint with the remains of an air-breathing coal reptile, which Professor Owen examined, described, and named Anthrakerpeton Crassosteum.

Its discovery was first printed in the "Geological Magazine," vol. 2, No. 1, January, 1865, it was reprinted in the "Transactions of the Cardiff Naturalists' Society," vol. 2, 1869.

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Again, in the latter end of 1868, beds of fossil shells were noticed in the Black Band overlying the Mynyddisllwyn coal, and some small organisms being observed, and said by Mr. Charles Moore, F.G.S., of Bath, to be entomostraca. They were sent to Mr. T. Rupert Jones, F.G.S., Professor of Geology and Mineralogy at the Royal Military College, Sandhurst, who kindly undertook to describe and name them. This paper is also published in the last "Transactions of the Cardiff Naturalists' Society."

I think I have now mentioned all the works on the fossils of this coal basin, and I would desire to call the attention of the numerous workers in this large field, workmen, agents at the various works, the professional men visiting them, as well as the landowners, to a more thorough examination than they have hitherto given; and I believe it will ultimately prove that the different coal and iron-stone beds in the various localities will be more readily compared than they now are.

Through a correspondence with some working colliers in Northumberland, I have been able to compare the fossil fish remains of our Bottom Vein, Pin Garrw, or Cribbwrfach coal, with a similar fish deposit over the equivalent coal in Northumberland. These working men are not only collectors, but they have prepared and mounted for me a large series of microscopical slides, showing the scales, teeth, jaws, bones, &c., of the fish remains of the olden time; and I believe the entomostracan bed over the Mynyddysllwyn coal can be compared with a similar bed in Lancashire; therefore, if true over these large and widely separated areas, surely they may prove useful over our own district.

As to the iron manufacture of the present with past times, I have just remembered a letter in the correspondence of Sir Edward Straddling, written to him June 29th, 1586, by Sir George Sydenham, of Combsydenham, Somersetshire, relative to an "anvil" which had been let or hired by Robert Hensley, of Selworthy, Somersetshire, to Thomas Sulley, of St. Athens, in Glamorganshire, for the term of one year, the rent of the year to be 3s. 4d., "and if the said Robert, or any of his brothers, required the anvil within the year, then they were to give one quarter's warning or notice, and an equivalent abatement to be made in the rent."

In the *Universal Magazine*, November, 1765, an article entitled "A Geographical Description of Glamorganshire" contains this statement: "Glamorganshire has no manufactures."

Before concluding, permit me to make one more remark, and that in regard to our Ordnance Survey map. That it is an admirable map no one can deny. I have had opportunities of working with it in several counties besides our own district, and I do not remember a single case in which an inaccuracy occurred; yet such a long time has elapsed since it was geologically surveyed—30 years ago—and this district has been so much opened up, that a new survey, on the 6-inch scale, is much needed.

Chandos Wren Hoskyns, Esq., of Harewood, Ross, the President for the

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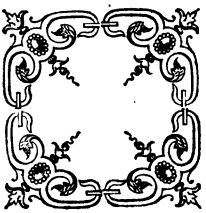
year 1870 of the British Archæological Association, whose meetings were held in Hereford, in his retiring address as President of the Woolhope Naturalists' Field Club, in 1868, said, in reference to the 6-inch map: "I believe that nothing is wanting but that useful operation which has been called 'kicking the shins of Government' to get this subject attended to, and a great boon to the whole community carried out."

Through continuously "kicking their shins" for a period of four years, they have at last commenced this survey; and probably the members of the Woolhope Club may have been of some service in bringing so desirable a matter about.



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The Woolhope Naturalists' Field Club.

MEETING AT WHITCHURCH.

REMARKS ON ALTITUDES OF HEREFORDSHIRE. WEATHER NOTES, ERRATA, AND MEASUREMENT OF THE RIVER WYE FROM HAY TO THE BRISTOL CHANNEL.

My remarks have reference chiefly to the question of altitudes of meteorological stations, by which I mean their height above sea level. This is a very important question for all scientific observers, and especially important to those who direct their attention to the rainfall.

Mr. G. J. Symons writes as follows:—"In all except mountainous districts the amount of rain collected increases about 2½ per cent. per 100 feet of increased elevation; therefore, it is evident that in the greater part of England an error of 50 feet in the height above the sea involves an error in the amount of rain indicated of (30 in. ÷ 100 × 1·25 = 0·38) about four-tenths of an inch." —*British Rainfall for* 1867, p. 9.

This extract sufficiently shows how important it is that every meteorologist or observer should know the height of his station above the sea. In order to determine this important point, we must either find the nearest bench mark of the Ordnance Survey, and take the levels from that point to our own station, or we must compare the readings of a tested standard barometer with the readings of another placed at a spot where the altitude is known. Of these two methods, the former is to be preferred if possible, but the latter, if carried out with skill and care, and repeated several times, will be found to give very correct results.

Sir Henry James (Director of the Ordnance Survey) tells us that "the *Datum Level* for Great Britain is the level of mean tide at Liverpool, as determined by our own observations, and it is eight-tenths of an inch above the mean tidal level obtained from the records of the self-registering tide guage on St. George's Pier, Liverpool." From this datum point levels have been run, to quote Mr. Symons again, "along a network of the principal turnpike roads throughout the country, bench marks being cut on millstones, gateposts, churches, and other permanent objects along these roads. From these initial lines subsidiary ones and contours have been completed in certain counties, and are in rapid progress in others; so that in the course of a few years there

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will not be an acre of land in the country the altitude of which above the one universal datum will be unknown. All Ireland, the northern counties of England, and the Southern ports of Scotland are thus favoured; other parts are in progress."

Two lines of Ordnance levels pass through Herefordshire, viz., one from Cardiff to Tenbury and another from Worcester to Aberystwyth. The former enters our county at Hay, and leaves it at Kid Castle: the latter enters the county at or near Little Hereford, and leaves it at Lingen's Bridge, near Brampton Bryan.

It will be seen at once that these levels do not come near Hereford, but fortunately the railway levellings have been made available through the kindness of friends, and thus we have been able to test the accuracy of the conclusions we had arrived at respecting the altitude of Hereford, *i.e.*, conclusions drawn from carefully made barometrical observations.

I had made various attempts to ascertain the height of our city above sea-level by means of simultaneous barometrical observations, and had come to the conclusion that my garden stands 184 feet above the sea, when it occurred to me to write to Mr. T. D. Roberts, C.E., then of Brecon, and ask the difference of level between Moorhampton station, on the Brecon line, and the Barton station at Hereford, intending afterwards to find the difference of level between Moorhampton station and Weobley, as the Ordnance line of levels passes near the latter place, and there is a first-class bench-mark (a bolt) on the church wall. But Mr. Roberts did much more than I asked, and very kindly saved me any further trouble; for he joined the levels of the Brecon line with those of the Ordnance Survey at Hay, and then made out and sent me the altitudes of all the stations from Hay to Hereford, thus furnishing us with what has been so long a desideratum to the scientific men of Hereford, viz., the height of the city above the sea as shown by actual levelling. According to Mr. Roberts the Moorfield station is 179 feet above the sea, and my garden is 182 feet.

Mr. Roberts's altitudes are as follows:—The rails at Hay station are 254·12 feet above the sea; Whitney, 259·78; Eardisley, 230·12; Moorhampton, 337·17; Credenhill, 251·62; Moorfields, 179·12; Barton, 175·77; the rails on bridge over canal at Widemarsh, 183·98.

Mr. Roberts afterwards sent the following altitudes:—The rails at Tram Inn station are 289 feet above the sea; St. Devereux, 281; Pandy, 345; Llanfihangel, 472; Pontrilas, 365; Abergavenny, 236; Penpergwm, 159.

Mr. Curley has given in his map of Hereford a number of very valuable levels, and by connecting these with those furnished by Mr. Roberts, we are able to ascertain the height of any portion of this city and its suburbs above the sea.

Mr. Curley has taken the average summer level at Wye Bridge for his datum point, and the figures in his map denote the heights in feet above this point, which is 31 feet below a mark on the Plinth of the Post Office. If we

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refer to Mr. Roberts's levels we shall see that the rails on the bridge over the Canal at Widemarsh are 183·98 feet above the sea. Mr. Curley has marked 31·4 at these rails; that is, they are 31·4 feet above his datum point at the Bridge, and therefore we know that the ordinary summer level of the Wye at Hereford Bridge is 152·58 feet above the sea. The ground at the west end of the Cathedral is 31·8 feet above the datum point, at the High Town 31·2 feet, and at the crossing of East-street and Church-street 35·5 feet. The highest ground in East-street, a few yards from this crossing, and some inches higher, is the highest part of Hereford (proper).

But the suburbs are much higher. Aylestone Hill, at the site of the demolished turnpike-gate, is 118·6 feet above the datum point, and at the highest part of Folly Lane 121·3 feet. The walk round the great reservoir at the Waterworks is 102 feet above the datum point, and that round the Filter Beds 88·6 feet. *No water service is to be laid higher than 77 feet.*

Thus by adding 152·58 feet to any of Mr. Curley's figures we ascertain at once the height of any portion of Hereford above sea level. I will here give a few of the most important altitudes:—Feet above sea level: Folly Lane, 273·88; Site of Aylestone Hill turnpike gate, 271·18; First Step of White Cross, 200·20; First Mile-stone on White Cross Road, 195·38; Crossing of Church-street and East-street, 188·08; Ground at West End of Cathedral, 184·38; at Shirehall, 183·88; at High Town and Old Timber House, 183·78; Richmond Place, 182·78; Mark on the Plinth of Post Office, 182·58; Commercial-street at the end of Gommond-street, 181·38; Widemarsh-street at meeting of Blue School-street and Cattle Market-street, 181·58; St. Owen-street at Mr. Cam's house, 179·98; Commercial-road at County Gaol, 171·38; at Gas Works, 169·68; Bridge over the Railway (at the foot of Aylestone Hill), 190·38; Crossing of Roads at foot of Aylestone Hill, 187·58; Surface of the Canal (opposite Barr's Court Station), 172·98.

Mr. Cole, the city surveyor, who, by the way, has afforded me some very valuable assistance in drawing up this paper, informs me that the rails at Barr's Court Station are 3·16 feet above the surface of the canal at Barr's Court, so that their altitude, at present, is 176·14 feet. From information received from the Engineer's office in 1869, and from a connection established by levelling between the Leominster rails and the Leominster bench marks in that year, it was concluded that the rails at Barr's Court Station were 174 feet above sea level, and this altitude will be found given in previous copies of the "Woolhope Transactions."

Measurements of heights by barometer are not, of course, capable of affording such exact results as measurements by the spirit level or theodolite. But very close approximation to the truth may be obtained when the stations are not very far apart, the instruments good, and the observers experienced and careful. When stations are many miles apart a number of observations should be made and the mean taken. Sometimes, I suppose when the air is unusually still, a very true result is obtainable at a great distance.

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Thus in the measurement of Etna by Sir John Herschel in 1824: Sir John measured the mountain by barometer and came to the conclusion that the altitude was 10,872 feet, or very nearly so. By trigonometrical survey, the altitude is found to be 10,874 feet 6 inches.

I was myself very successful in a single visit to Garway Hill, October 2nd, 1868, and here transcribe my own account from the "Transactions" for 1871:—

"Garway Hill was measured a second time on October 2nd, 1868. The day was calm, and everything most favourable. Three barometrical readings were taken simultaneously, at intervals of half an hour each, both on Garway and at Hereford.

"The mean of the three barometrical readings at Hereford was 29·928 inches corrected; and the mean of the three readings of the detached thermometer 50·7.

"The mean of the three barometrical readings taken on Garway was 28·832 inches corrected; and the mean of the three readings of the detached thermometer 47°.

"The barometrical difference between Hereford and Garway was 1·096 inch, and the mean temperature (Hereford and Garway) 48·8. This, allowing for height of barometers above the ground, showed an altitude of 1,013 feet 10 inches, or, in round numbers, 1,014 feet. Add to this 182 feet, the height of Richmond-place above the sea, and we have 1,196 feet for the height of our mountain. The Ordnance survey determines it to be 1,197 feet. As the barometers were 10½ miles apart, this was a most satisfactory instance of barometrical measurement."

The following barometrical altitudes are given as close approximations to the truth, and every succeeding observation will, of course, add to the certainty:—

That portion of the Black Mountain which is marked Hatterall-hill in the Ordnance Map, 1747·61 feet above the level of the sea; Garway-hill, 1196; Acornbury, 916·18; Lady Lift, 915·18; Deerfold Camp, 912·98; Seager-hill, 886·78; Egdon-hill, 842·88; Marcle-hill, 769·78; Backbury-hill, 729·18; Credenhill, 713·38; Hough Wood, 623·78; Dinedor, 605·88; Pool Cottage, 485·18; Whitfield, 427·78; Bryngwyn, 426·98; Sellack Vicarage, 242·78; Mr. Ballard's Lawn at Tupsley, 233·35.

During 1872 my observations went on as usual, but I made few notes; those given below, however, will be found sufficient to direct attention to the most interesting meteorological events during the wettest year recorded in this county. In 1852, the next in order of remarkably wet years, so[t] far, at least, as our county is in question, there was only one rainguage at work during the *whole* year. The observer was Benjamin Boddington, Esq., of Burcher Court, Titley. His record for 1852 is as follows:—January, 5·57 inches; February, 2·70; March, 0·40; April, 0·60; May, 1·83; June, 4·88; July, 2·26; August, 5·66; September, 2·49; October, 3·18; November, 9.52;

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December, 4·44; total, 43·53. But in 1852 J. M. Herbert, Esq., of Rocklands, commenced that valuable series of observations which is still continued, affording us most important rainfall information respecting 1852 (for nine whole months) and for every year since. His record for nine months of 1852 is as follows:—April, 0·38 inches; May, 1·89; June, 5·37; July, 2·87; August, 4·78; September, 3·00; October, 4·04; November, 9·48; December, 4·46; total, 36·27.

In 1872 the total of rainfall at Rocklands was 48·68 inches, and the Titley total, 49·54 inches.

At Richmond Place, Hereford (gauge 5ft. 8in. from the ground), the total was 42·26 inches, and at Mr. Davison's Nursery Gardens, White Cross (gauge 1 foot from the ground), 44·50 inches.

It must be understood that at Rocklands and Titley the rainfall is usually heavier than at any other place in Herefordshire where a gauge has been placed hitherto.

For the rest I must refer the readers of the "Woolhope Transactions" to The Tables which, when compared with the work of other observers, will be found, I trust, at all events, as correct and satisfactory as those which have preceded them.

I subjoin, however:—Some barometrical readings (corrected but not reduced to sea-level) registered by me during a most extraordinary depression in January, 1873; A few corrections of errors in figures which have here and there crept into tables, distances, and altitudes, in previous copies of the "Woolhope Transactions; And the result of a careful measurement of the river Wye as given in the Ordnance Map.

1st. Extraordinary depression of the barometer from January 19th to 22nd, 1873:—19th: 9 a.m., 28·598 inches; 10.15 a.m., 28·518; 1.30 p.m., 28·438; 6 p.m., 28·348; 6.30 p.m., 28·338; 7.45 p.m., 28·300; 9.20 p.m., 28·280; 10 p.m., 28·247; night, 28·252. 20th: 9 a.m., 28·265; 4 p.m., 28·160; 7.45 p.m., 28·202; 8.30 p.m., 28·242; 9.45 p.m., 28·315. 21st: 9 a.m., 28·700. 22nd: 9 a.m., 28·509. 23rd: 9 a.m., 29·325. 19th and 20th: Snow with lightning about 8 p.m.; loud thunder at 7.30 p.m. on 20th. With the exception of the snow no storms whatever followed this great fall of the mercury.

2nd. ERRATA, &c.—In "Woolhope Transactions" for 1870, page 232, The Graig, at Archenfield, Ross, is said to be 101 feet higher than Richmond-place, Hereford. This is a mistake. Some very carefully conducted observations were made simultaneously at Hereford and Ross in order to determine the relative heights of the two places, but unfortunately an error crept into the calculations and was carried all through the work, being applied to every one of the observations. Recent barometrical observations show that Mr. Southell's rain gauge at Archenfield is 200 feet above the sea (very nearly), or about 18 feet higher than the surface of the ground at Richmond-place. This altitude agrees well with what we know of the fall of the river. The summer level of the Wye at Hereford Bridge is 152·58 feet, and the fall as far

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as Ross averages (very nearly) 2 feet to the mile. The distance by river from Hereford to Ross is 26½ miles, and Mr. Southall's garden is (by aneroid) 100 feet above the river. Thus the summer level of the river at Ross is 99·58 feet above the sea and Mr. Southall's garden 199·58 feet above the sea.

In "The Transactions also for 1870, page 232, Whitfield is said to be more than 400 feet above Hereford; it should be, *more than* 200 *feet.*

In note to Rainfall Table for 1870 Stretton Rectory is said to be 2 miles W.N.W. of Hereford; it should be 3 *miles* 1 *furlong.* Also the Archenfield rain guage is said to be 280 feet above the sea. It should be, *about* 200 *feet.*

In note to Rainfall Table for 1871 Fownhope is said to be lower than Hereford. But the rain guage is at the Vicarage, which stands higher than the village and many feet higher than the river. See Rainfall Table for 1873. In "Transactions" for 1871, page 35, for *Leyster's Pole* read bench mark.

In the year 1867 the following Rainfall tables were printed in "The Woolhope Transactions":—1st, the Pool Cottage records, by the late Captain Pendergrass, extending over 25 years, viz., from 1818 to 1842; 2nd, Hereford Rainfall, by the late Henry Lawson, Esq., St. Owen's-street, Hereford, extending from 1826 to 1841; 3rd, the Titley records, by the late Benjamin Boddington, Esq., of Burcher Court, Titley, extending from 1841 to 1852; 4th, the Rocklands records, by J. M. Herbert, Esq., from April, 1852, to the end of 1857.

These tables were unfortunately printed without correction, and the following errata were very kindly furnished by G. J. Symons, Esq.

Pool Cottage records:—For 22 years, in first line, read "25 years"; at August, 1818, for 0·52, read "0·50"; at total for same year, for 27·09, read "27·27"; at total for 1828, for 88·05, read 38·05; at total for 1837, for 30·12 read "30·14"; at May, 1842, for 2·42, read "2·45"; at total for 1842, for 29·90, read "29·92"; at total of all the May totals, last line, for 52·17, read "52·19"; and in same line, at total of August totals, for 59·18, read "59·16."

Rocklands records:—At April, 1861, for ·66, read "·60"; at December, 1852, for 4·36, read "4·46"; at total for 1852, for 36·17, read "36·27" at total for 1861, for 31·91, read "31·85."

3rd. Result of a careful measurement of the River Wye on the Ordnance Map, in lengths of one-eighth of an inch each:—

From Hereford Bridge to Panson, 1m.; Vineyard, 1m. 7f.*; Hampton, 3m. 5f.; Mordiford, 6m. 5f.; Fownhope, 9m. 2f.; Mancel's Ferry, 11m.; second Railway Bridge, 13m. 4f.; Hoarwithy, 15m. 3f.; Sellack Ferry, 17m. 1f.; third Railway Bridge, 18m. 2f.; Much Fawley, 19m. 4f.; Island at Court Farm, 22m.; Foy, 22m. 4f.; fourth Railway Bridge, 24m.; Ross, 26m. 2f.; Walford, 31m.; Goodrich, 31m. 7f.; Bishop's Wood, 33m. 2f.; Symond's Gate or Yatt, 37m.; Rocklands, 38m. 2f.; Whitchurch, 39m. 2f.; (the Wye leaves Herefordshire at Little Hadnock, 43m. 3f. from Hereford Bridge); Monmouth Bridge, 45m. 2f.; Chepstow Bridge, 62m. 2f.; Mouth of

* f. furlong.

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Wye, 65m. 2f. Measuring in the other direction, we find the distances of the chief points from Hereford to be as follows:—Belmont, 2m.; Breinton, 2m. 3f.; Island at Eaton Ferry, 4m.; Sharp Curve of River at Old Weir, 5m. 1f.; Canon Bridge, 6m. 4f.; Mouth of Brook between Lulham and Newcourt, 8m.; Ferry at Bridge Farm, 8m. 5½f.; Preston-on-Wye, 10m. 5f.; Moccas, 13m. 2f.; Brobury, 14m.; Bredwardine, 15m. 4f.; Horse Shoe (sharpest bend of the river in all the map), 17m. 1f.; Willersley, 19m.; Ferry at Clock Mill, near Winforton, 20m. 6½f.; Island at Lockstock Pool, 23m.; Whitney, 24m. 2f.; Bridge at Hay, 29m.

Thus the Wye has a course through Herefordshire of 72 miles 3 furlongs in length; and the distance from Hay to the mouth of the river is 94 miles 2 furlongs.

EDWIN J. ISBELL.

Weather notes for 1872 by Mr. Southall, of The Graig, near Ross, and Mr. William Cooke, of Hereford:

1872. Rainfall.—This was very remarkable, being the wettest year since 1852, and probably slightly in excess of that year, but the comparison is not a very accurate one, the rainfall for that year at Titley having been 43·53, whereas at Ross in 1872 41·43 inches fell, thus distribnted:—1st month, 4·25 in.; 2nd month, 3·58 inches; 3rd month, 2·11 in.; 4th month, 2·61 in.; 5th month, 1·82 in.; 6th month, 3·25 in.; 7th month, 7·74 in.; 8th month, 1·74 in.; 9th month, 1·81 in.; 10th month, 3·11 in.; 11th month, 5·52 in.; 12th month, 3·89 in.—41·43 in. The number of days on which ·01 or more fell being 223 as against 128 in 1870, so that the rainfall was not only heavy but continuous. In January 24 such days; February 22 ditto; June 21 ditto; October 21 ditto; November 23 ditto; December 22 ditto. Heavy falls at Ross; January 22nd, 1·21 in.; April 26th, ·72 in.; July 28th, 1·83 in.; November 25th, ·72 in.; December 16th, ·74 in. And while there were comparatively few falls of more than ¾ inch in 24 hours, there were a large number of about ½ inch.

Thermometer.—Lowest reading, January 16th, 20·7°; lowest reading in February 32°, on 27th; lowest reading in March, 25°, on 10th. A week's frost from 20th to 27th March, descending to 18° on grass on 26th. On 13th April, in brilliant cloudless weather, the thermometer rose to 72° in shade, and descended to 28° at night. In May, on the 23rd and 24th, two sharp frosts, 31° and 32° respectively, The 17th and 18th of June very hot, 85° and 90° in shade, followed by slight thunderstorms. In Birmingham 2·74 inches in an hour. July 21st and 22nd very hot, 88° and 85·8°, followed by heavy thunderstorms. A remarkable effect produced by view of distant storm E. to N.W., with constant flashes. August 9th to September 4th very fine harvest weather; September also a fine month. October 3rd, frost 32° min., 28° grass; October 6th, 33·1° min., 30° grass; Oct. 12th, 32° min., 29° grass; Oct. 13th, 34° min., 29·8° grass; Oct. 14th, 28·1° min., 26·2° grass; Oct. 15th, 28·5° min., 27° grass; Oct. 16th, 32° min., 30° grass; Oct. 17th, 31° min., 29° grass—Oct. 12th to 17th

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very cold week, followed by rain. November 10th on 19th continued frosts—on the 11th 29° min., 25° grass. This was again followed by continuous heavy rain, which caused the Wye to overflow its banks, and it was higher than any time since 1869. December, 1869, height of flood at Wilton Bridge, 13 feet 3 inches; Nov. 1872, 12 feet 6 inches. This time, Nov., 1872, the water continued nearly at highest for 4 days successively. December 5th, thermometer 22·5 min., 17·8 grass; 12th, 21 min., 18 grass; 13th, 23 min., 23 grass; 18th, flood on Wye, 11 feet 6 inches, caused by gale from S. to W., producing at Ross, however, only ·74 rain.

1873. As nearly as possible average rainfall, but very showery summer. Warm and wet January, and exceedingly dry and cold December. July 20th to 23rd intensely hot—81°, 85·5°. 93°, 84°. Also, August 8th and 9th, 84° and 80°. October 28th, ther. min., 21·7; 29th, 21·8. From November 8th to December 30th only ·55 inches rain on eight days. December 9th (thermometer), 23° min.; 10th, 19·5°; 11th, 17·8°; 12th, 14°; 13th, 18°; 14th, 18°. During this time ponds bore for skating, and the rime continued in thick furriness on the trees, having a splendid appearance. The fog was almost continuous and very dense.

HENRY SOUTHALL.

Notes of storms in 1872.—January 1st, 4th, gales from S.S.W.; also on 7th. Eighteen days on which ·01 rain fell during daylight. February, 8 wet days during month; March 13 ditto; April 11 ditto. May 22nd, thunder in the afternoon; 23rd, thunderstorms from 12.20 until 12·40 p.m. One very vivid flash of lightning (said by another observer to be of a rose pink colour), followed instantaneously by a terrific peal of thunder. Heavy rain followed. The Time Gun was on this occasion fired by the electric fluid. Twelve wet days during month, June—Thunderstorm on morning of 19th; also on 24th, between 2 and 3.30 p.m., when torrents of rain fell for 30 minutes; thunderstorms on 24th and 25th, accompanied by rain. It appears from Mr. Symonds' Magazines a series of thunderstorms occurred on the 17th, 18th, and 19th, in almost all parts of the country on one of these days. Seventeen wet days during month. July—Thunderstorm on 6th; on 7th occurred the most violent storm that has been known in this district for some years. The storm commenced in earnest at 3.12 p.m., and concluded at 4.40 p.m., 1·45 inches rain falling during that period. The thunder and lightning followed in quick succession during almost the whole of the time. Thunderstorms on 25th and 29th instants. Eleven wet days during month. August—Thunderstorms on 5th and 7th. Ten wet days during month. September—Thunderstorm on 4th. Twelve wet days during month. October—Gale during day and night of 10th. Fifteen wet days during month. November—Great gale during night of 23rd. Nineteen wet days during month. December—Gale on the night of 8th. Fourteen wet days during month.

160 wet days during the year, *that is when* ·01 *or more has fallen during daylight.*

WILLIAM COOKE.

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TABLE I.

1872.	BAROMETER.					WIND.							
	Highest reading at 9 a.m. corrected but not reduced to sea-level.		Lowest reading at 9 a.m., corrected but not reduced to sea-level.		Monthly means of 9 a.m. readings	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
						Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.
	INCHES.	DATE.	INCHES.	DATE.	INCHES.								
January	29·927	12th	28·424	24th	29·367	1	1	2	6	8	8	1	4
February	29·990	27th	29·249	25th	29·557	1	1	3	11	4	8	1	0
March	30·133	10th	29·069	30th	29·601	1	6	1	10	2	3	2	6
April	30·294	6th	28·942	22nd	29·715	2	1	0	2	5	6	2	12
May	30·179	26th	29·128	7th	29·864	0	8	0	3	0	4	3	12
June	30·088	16th	29·101	9th	29·683	0	1	0	10	2	5	6	6
July	30·044	4th	29·537	30th	29·723	3	1	2	5	3	3	4	9
August	30·134	24th	29·308	2nd	29·789	1	7	3	6	2	6	2	4
September	30·142	13th	29·247	24th	29·672	1	1	2	0	2	6	8	10
October	30·138	6th	28·899	25th	29·528	2	5	1	6	3	6	2	2
November	30·308	29th	28·680	23rd	29·515	4	1	0	3	9	6	5	1
December	29·812	12th	28·788	25th	29·355	2	0	1	1	5	15	4	2
	Yearly mean of 9 a.m. Readings, 29·614 inches.					18	33	15	63	45	76	40	68

Cistern of Barometer 187 feet above sea-level.

EDWIN J. ISBELL.
WILLIAM COOKE.

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TABLE II.

THERMOMETERS.

1872.	Highest reading in shade, and date.		Lowest reading, and date.		Mean of maximum readings.	Mean of minimum readings.	Mean of 9 a.m. readings in shade.	Monthly means.
	DEGREES.	DATE.	DEGREES.	DATE.	DEGREES.	DEGREES.	DEGREES.	DEGREES.
January	54·8	31st	26·0	10th & 15th	48·87	35·42	40·48	41·94
February	57·0	22nd	35·1	3rd	50·88	39·62	44·06	44·85
March	62·7	30th	25·4	26th	53·18	36·94	45·39	44·06
April	73·3	12th	27·5	20th	59·96	38·37	50·29	47·66
May	73·2	1st	32·2	19th	61·56	41·80	53·46	49·98
June	87·9	18th	35·3	7th	70·14	49·35	62·12	57·94
July	88·5	21st	42·8	31st	75·99	54·58	67·59	63·38
August	87·2	18th	42·0	13th	73·69	51·49	64·03	60·89
September	80·6	4th	35·4	23rd	67·34	49·80	59·76	57·27
October	65·0	2nd	28·7	15th	55·70	40·02	48·26	46·86
November	59·4	4th & 5th	27·7	18th	49·79	38·50	45·14	43·74
December	53·0	22nd	24·0	12th	46·48	36·93	41·61	41·70

Yearly mean Temperature, 50·02.

Thermometers 4 feet above ground and 186 feet above sea level.

EDWIN J. ISBELL.
WILLIAM COOKE.

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TABLE III.

RAINFALL OF HEREFORDSHIRE.

1872.	Hereford, Richmond Place. 5-ft. 8-in. from the ground.	Hereford, Mr. Davison's gardens. 1-ft. from the ground.	Fownhope Vicarage. 13-in. from the ground.	Tupsley. 1-ft. from the ground.	Stretton Rectory. 1-ft. from the ground.	Leominster. West Lodge. 1-ft. from the ground.	Sellack Vicarage. 5-in. from the ground.	Archenfield, Ross. 1-ft. from the ground.	Rocklands. 1-ft. 11-in. from the ground.	Hagley Park. 6-in. from the ground.	Staunton-on-Wye. 1-ft. from the ground.	Burcher Cottage, Titley. 2-ft. 8-in. from the ground.
	Inches.	The records of the monthly totals for this guage are lost, but they are of course very similar to those given in the preceding column.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
January	4·663		4·26	4·08	5·17	4·88	4·17	4·25	5·65	3·62	6·14	5·41
February	3·371		3·33	3·32	3·56	3·28	3·52	3·58	4·95	3·02	3·25	2·84
March	1·781		2·00	1·66	2·00	2·35	2·22	2·11	2·87	1·59	2·28	3·15
April	2·723		2·92	2·77	2·85	3·09	2·56	2·61	2·81	2·53	3·16	3·55
May	1·377		1·80	1·57	1·25	1·68	2·07	1·82	1·76	1·60	1·31	1·67
June	3·571		3·98	3·28	3·41	3·25	3·56	3·25	3·26	3·12	3·44	3·61
July	5·839		5·40	5·21	4·78	4·40	6·78	7·74	6·69	4·79	5·45	5·73
August	2·202		2·34	2·01	2·12	2·28	1·71	1·74	2·36	2·18	2·49	3·15
September	2·127		1·99	2·07	1·89	2·67	2·01	1·81	2·30	2·07	1·81	2·87
October	4·091		3·78	3·92	3·79	4·04	3·45	3·11	4·21	3·81	4·15	4·94
November	5·567		5·32	5·89	5·64	4·90	5·57	5·52	6·81	4·54	5·49	6·27
December	4·947		4·32	5·02	5·02	4·54	4·22	3·89	5·01	4·60	5·85	6·35
Totals	42·259	44·50	41·44	40·80	41·48	41·36	41·84	41·43	48·68	37·47	44·82	49·54

For the altitude of any station, and its distance and bearing from Hereford, see foot note to the Rainfall Table for 1873.

EDWIN J. ISBELL.
WILLIAM COOKE.

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TABLE I.

1873.	BAROMETER.					WIND At 9 a.m. Daily.							
	Highest reading at 9 a.m. corrected but not reduced to sea-level.		Lowest reading at 9 a.m. corrected but not reduced to sea-level.		Monthly means of 9 a.m. readings	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
						Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.
	INCHES.	DATE.	INCHES.	DATE.	INCHES.								
January	29·907	31st	28·265	20th	29·477	2	0	0	0	3	16	6	4
February	30·566	18th	28·625	26th	29·918	2	0	3	3	10	6	3	1
March	29·970	25th	28·945	7th	29·630	0	1	2	2	2	10	11	3
April	30·181	10th	29·418	15th	29·853	3	3	4	2	2	12	3	1
May	30·188	29th	29·085	20th	29·752	4	5	1	3	4	3	4	7
June	30·083	7th	29·389	12th	29·810	1	7	2	4	1	4	3	8
July	29·996	19th	29·444	13th	29·767	0	0	0	5	7	10	4	5
August	30·157	17th	29·261	28th	29·741	0	0	2	4	4	6	10	5
September	30·371	22nd	29·066	15th	29·775	2	4	0	4	0	11	4	4
October	30·342	28th	28·785	23rd	29·668	1	1	0	6	7	3	4	8
November	30·326	16th	28·943	1st	29·688	2	10	4	1	1	4	2	5
December	30·450	12th	29·340	31st	30·068	0	0	0	2	7	5	6	6
	Mean of 9 a.m. Barometrical Readings, 29·763 inches.					17	31	18	36	48	90	60	57

Cistern of Barometor 197 feet above mean sea-level.

EDWIN J. ISBELL.
WILLIAM COOKE.

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TABLE II.

THERMOMETERS.								
1873.	Highest reading in shade, and date.		Lowest reading in shade, and date.		Mean of maximum reading.	Mean of minimum readings.	Monthly means.	Degree of Humidity.
	DEGREES.	DAY.	DEGREES.	DAY.	DEGREES.	DEGREES.	DEGREES.	DEGREES.
January	55·2	13th	25·0	29th	46·54	37·29	41·68	89·2
February	53·0	26th	24·0	25th	41·61	30·91	36·46	88·3
March	65·3	28th	25·0	13th	50·60	34·59	41·59	79·1
April	73·1	16th	28·0	26th	56·90	38·44	46·17	77·2
May	76·7	12th	31·7	20th	64·99	41·81	51·70	75·8
June	81·2	21st	39·4	4th	70·37	50·19	58·48	78·6
July	94·1	22nd	43·6	29th	73·79	51·62	60·80	74·8
August	82·9	7th	44·7	4th	72·70	54·00	61·60	78·1
September	75·1	26th & 27th	30·0	29th	64·69	46·32	54·20	79·2
October	71·4	1st	23·0	28th	56·27	39·37	46·82	87·2
November	59·0	22nd	28·0	16th	48·83	38·96	43·49	87·2
December	57·2	16th	22·2	29th	45·78	33·85	39·81	92·7
Mean temperature of the year, 48·56.								

EDWIN J. ISBELL.
WILLIAM COOKE.

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TABLE III.

RAINFALL IN HEREFORDSHIRE.

1873.	Hereford, Richmond Place, 5-ft 8-in from the ground.	Fownhope Vicarage, 13-in from the ground.	Tupsley. 1-ft from the ground.	Stretton Sugwas. 1-ft from the ground.	Leominster. 1-ft from the ground.	The Graig, near Ross. 1-ft. from the ground.	Rocklands. 1-ft 11-in from the ground	Bromyard. 12-in from the ground.	Hayley Park. 6-in from the ground.	Staunton-on-Wye. 1-ft from the ground.	Burcher Cottage, Titley. 2-ft 8-in from the ground.	Lynhales, Kington. 1-ft. from the ground.	Leysters Vicarage, Leominster. 4-in from the ground.	Careswall, Much Marcle. 3-ft from the ground.	Bryngwyn. 11-in from the ground.	Sellack Vicarage. 6-in from the ground.
January	3·368	3·76	3·17	3·40	2·91	4·00	6·11	3·74	3·10	3·53	4·87	1·97	3·81	3·75	4·48	4·01
February	1·429	1·95	1·03	1·32	1·02	1·30	1·18	1·61	0·98	1·44	1·22	1·68	1·01	1·35	1·38	2·44
March	2·912	3·13	2·32	2.95	2·79	3·39	4·30	2·97	3·05	2·79	3·78	3·72	3·40	2·86	2·91	3·36
April	1·032	0·75	1·62	1·08	0·81	0·89	0·90	0·94	0·54	1·43	1·42	1·18	0·98	0·67	1·38	0·95
May	1·910	2·01	0·88	1·63	2·13	2·00	2·12	2·13	1·89	2·15	2·28	2·35	2·48	2·52	2·11	2·06
June	2·938	3·22	2·96	2·66	2·57	1·85	3·12	3·44	4·30	2·20	2·21	1·91	2·66	3·27	1·55	3·35
July	2·478	2·00	1·79	2·76	2·96	2·35	2·74	3·80	1·90	2·39	3·15	2·86	3·03	2·08	3·67	1·96
August	2·706	3·04	1·97	2·48	2·66	3·60	4·21	3·91	2·62	2.30	3·98	3·32	3·32	3·51	3·05	3·10
September	1·574	1·40	2·08	1·49	1·33	1·49	1·70	1·66	1·93	1·43	1·47	1·33	1·61	1·48	1·47	1·49
October	1·543	1·77	1·65	1·60	1.49	2·12	2·36	1.68	1·81	1·83	1·96	2·01	2.18	2·17	2·09	1.83
November	1·795	1·76	1·67	1·80	1·65	2·11	2·58	1·66	1·75	2·17	2·57	2·26	1·64	1·55	2·17	1·79
December	0·771	0·55	0·66	0·81	0·43	0·52	0·77	0·74	0·70	0·81	1·51	0·83	0·70	0·66	0·68	0·60
Totals	24·456	25·34	22·30	23·98	22·75	25·62	32·09	28·28	24·57	24·47	30·42	25·42	26·82	25·87	26·94	26·94

NOTE.—**Hereford Cathedral (Lat. 52° 3′ 13·9″ N., Long. 2° 42′ 53·5″ W.)** stands on ground 184 feet above half-tide sea-level. **The Richmond Place gauge** stands 6 feet above the ground and 178 feet above sea-level. The gauge at Mr. Davison's gardens is one foot above the ground and 202·04 feet above the sea. Fownhope Vicarage (5 miles 3½ furlongs S.E. of Hereford) is, by barometrical measurement, 192 feet above sea-level. Tupsley (1¼ mile E. of Hereford) is, by barometer, 233 feet above the sea. Stretton Vicarage (3 miles 1 furlong W.N.W. of Hereford) is estimated, on very good grounds, to be 200 feet above sea-level. Leominster (about 12 miles N. of Hereford) is, at the junction of Dishley Street and West Street, 262 feet above sea-level, and at the front of the Town Hall 249 feet, ORDNANCE LEVELLING. The Graig, Ross (11¼ miles S.E. by S. of Hereford) is, by barometrical observation, 200 feet above sea-level. Rocklands (14 miles S.S.E. of Hereford) is estimated 150 feet above sea-level. Bromyard is 12 miles 7½ furlongs N.E. of Hereford, but its height above sea-level has not been determined. Hagley Park (3 miles E. by N. of Hereford) is, by barometer, 298 feet above the sea. Staunton on Wye (8 miles 6½ furlongs N.W. of Hereford) is about 255 feet above the sea. Burcher Cottage near Titley, is 16 miles 4½ furlongs N.W. by N. of Hereford, and (by barometer) 550 feet above the sea. Lynhales is 14 miles 4 furlongs N. W. of Hereford but its height above sea-level has not been determined. Leysters at the Church-house is 15 miles N.N.E. of Hereford, but the height of the Vicarage above sea-level has not yet been determined. The road at Leyster's Pole is, by Ordance Survey, 702 feet above the sea. Careswall, Much Marcle (9 miles E.S.E. of Hereford) is, by barometer, 423 feet above sea-level. Bryngwn (6 miles 2 furlongs S. by W. of Hereford) is, by barometer 432 feet above sea-level. Sellack Vicarage is 8¼ miles S.S.E. of Hereford, and, by barometer, 240 feet above the sea.

All the measurements of distance from Hereford, given above, have been made on the Ordnance Map in perfectly straight lines.

EDWIN J. ISBELL.
WILLIAM COOKE.

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TABLE IV.

HEREFORDSHIRE RAINFALL

FROM 1818 TO 1873.

Year.	Pool Cottage, Dewchurch.	St. Owen's Street Hereford.	Titley, Herefordshire.	Rocklands, near Ross.	West Lodge, Leominster.	Archenfield, Ross.	Stretton, near Hereford.	Sellack.	Tupsley, near Hereford.	Richmond Place, Hereford,	White Cross, Hereford.
1818	27·27	..	..	..	..	..	..	..	..	..	..
1819	26·78	..	..	..	..	..	..	..	..	..	..
1820	22·43	..	..	..	..	..	..	..	..	..	..
1821	35·21	..	..	..	..	..	..	..	..	..	..
1822	30·26	..	..	..	..	..	..	..	..	..	..
1823	33·85	..	..	..	..	..	..	..	..	..	..
1824	31·76	..	..	..	..	..	..	..	..	..	..
1825	24·56	..	..	..	..	..	..	..	..	..	..
1826	25·33	23·37	..	..	..	..	..	..	..	..	..
1827	26·96	21·93	..	..	..	..	..	..	..	..	..
1828	38·05	31·23	..	..	..	..	..	..	..	..	..
1829	28·74	25·49	..	..	..	..	..	..	..	..	..
1830	32·87	29·31	..	..	..	..	..	..	..	..	..
1831	34·28	31·03	..	..	..	..	..	..	..	..	..
1832	26·84	25·23	..	..	..	..	..	..	..	..	..
1833	28·63	25·33	..	..	..	..	..	..	..	..	..
1834	29·09	(lost)	..	..	..	..	..	..	..	..	..
1835	32·13	29·27	..	..	..	..	..	..	..	..	..
1836	30·59	28·16	..	..	..	..	..	..	..	..	..
1837	30·14	26·20	..	..	..	..	..	..	..	..	..
1838	35·64	27·64	..	..	..	..	..	..	..	..	..
1839	40·63	34·40	..	..	..	..	..	..	..	..	..
1840	24·70	21·38	..	..	..	..	..	..	..	..	..
1841	39·78	32·14	35·01	..	..	..	..	..	..	..	..
1842	29·92	..	33·38	..	..	..	..	..	..	..	..
1843	..	..	35·47	..	..	..	..	..	..	..	..
1844	..	..	23·59	..	..	..	..	..	..	..	..
1845	..	..	29·69	..	..	..	..	..	..	..	..
1846	..	..	30·77	..	..	..	..	..	..	..	..
1847	..	..	29·99	..	..	..	..	..	..	..	..
1848	..	..	37·85	..	..	..	..	..	..	..	..
1849	..	..	28·38	..	..	..	..	..	..	..	..
1850	..	..	22·70	..	..	..	..	..	..	..	..
1851	..	..	24·58	..	..	..	..	..	..	..	..
1852	..	..	43·53	..	..	..	..	..	..	..	..
1853	..	..	27·70	30·19	..	..	..	..	..	..	..
1854	..	..	21·40	19·42	..	..	..	..	..	..	..
1855	..	..	24·60	25·12	..	..	..	..	..	..	..
1856	..	..	31·70	32·56	..	..	..	..	..	..	..
1857	..	..	31·88	26·18	..	..	..	..	..	..	..
1858	..	..	27·93	24·04	22·46	..	..	..	..	..	..
1859	..	..	34·96	33·53	28·64	28·14	..	..	..	..	..
1860	..	..	38·28	40·77	29·67	33·01	..	..	..	..	..
1861	..	..	31·40	31·85	25·50	25·94	23·60	..	..	..	..
1862	..	..	36·26	35·27	29·09	29·58	28·36	27·29	..	..	..
1863	..	..	28·44	29·32	22·15	25·26	22·18	23·00	..	..	..
1864	..	..	..	22·28	19·43	19·18	18·65	16·82	..	..	..
1865	..	..	..	32·44	27·10	28·58	27·38	24·89	23·42	..	..
1866	..	..	34·07	37·17	31·51	29·16	27·57	26·07	26·58	..	..
1867	..	..	..	31·55	25·26	29·10	28·17	30·64	28·20	28·17	..
1868	..	..	33·87	37·13	31·85	29·04	28·98	29·63	27·38	28·53	30·48
1869	..	..	33·99	38·13	29·49	33·25	30·48	32·15	30·68	30·96	32·22
1870	..	..	24·81	26·20	18·87	20·18	16·77	21·27	17·68	18·63	18·99
1871	..	..	33·76	33·77	27·76	29·41	29·17	28·47	26·06	27·74	28·43
1872	..	..	49·54	48·68	41·36	41·43	41·48	41·84	40·80	42·26	44·50
1873	..	..	30·42	32·09	22·75	25·62	23·98	26·94	22·30	24·46	24·32
	Mean of 25 years, 30·65	Mean of 15 years, 27·47	Mean of 30 years, 31·66	Mean of 21 years, 31·79	Mean of 16 years, 27·05	Mean of 15 years, 28·45	Mean of 13 years, 26·67	Mean of 12 years, 27·41	Mean of 9 years, 27·01	Mean of 7 years, 28·68	Mean of 6 years, 29·82

EDWIN J. ISBELL.
WILLIAM COOKE.

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HEREFORDSHIRE ORDNANCE BENCH MARKS FROM THE "ABSTRACTS OF LEVELLING" PUBLISHED BY THE ORDNANCE DEPARTMENT.

HEREFORDSHIRE PORTION OF THE ABSTRACT OF LEVELLING FROM CARDIFF TO TENBURY THROUGH THE TOWNS OF MERTHYR TYDFIL, BRECKNOCK, HAY, AND LEOMINSTER, WITH BRANCHES TO TRIGONOMETRICAL STATIONS, &c

COMMENCED 27TH. DECEMBER, 1850. COMPLETED 29TH. FEBRUARY, 1856.

(This line of levels enters Herefordshire at Hay, passes through Leominster, and leaves the county at Kid Castle, 2¼ miles S.W. of Tenbury. The coach road from Hay to Tenbury, through Leominster, is followed, but there are branches to trigonometrical stations as stated above; thus Eardisley, Weobley, Kimbolton, &c., possess Ordnance Bench marks, although these places are not situated on the direct road from Hay to Tenbury, and are, therefore, out of the main line of levels.—E. J. I.)

	Altitudes in feet above mean level of the sea at Liverpool.
Bolt in east corner of Cooper's Hall Toll-house, at east end of Hay, 2·15 feet above surface...	254·867
Mark on south parapet of Pontfain over stream, 1·99 feet above surface	267·195
Mark on boundary-stone in fence, at N. side of road, marked "T. S. P.," 1·50 feet above surface	325·655
Mark on north-west corner of Mr. Chambers's barn, at west end of Clifford village, 2·44 feet above surface	286·494
Mark on corner of Lake House, near junction ot tram-road, at south side of road, 1·54 feet above surface	232·343
Mark on west end of north parapet of small bridge under road, 0·83 feet above surface	227·278
Bolt in N. end of N. parapet of Whitney Bridge, over the river Wyr, 0·66 feet above surface	238·555
Mark on south-west corner of Whitney church tower, 2·44 feet above surface	288·130

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Mark on the 16th milestone from Hereford, 3·27 feet above surface ... ... 227·738

Mark on S. corner of shed at junction of tramroad, N. side of road, 1·90 feet above surface... ... ... 224·479

Bolt in west side of Winforton church tower, 3·61 feet above ... ... 226·437

Mark on south end of culvert at angle of fence, south side of road, 1·71 feet above surface... ... ... 219·595

Mark on north parapet of Willersley Bridge over stream, 2·09 feet above surface ... ... 215·774

Nant-y-glas-dwr Gate Toll-house, at junction of roads; mark on front, 2·28 feet above surface ... ... 299·331

Cusop Church: Bolt in north side, at west end of chancel ... 482·165

Clifford Church: Bolt in north side of tower, at east side of door, 1·95 feet above surface... ... ... 524·836

Eardisley Church: Bolt in south-west corner of tower, 1·53 feet ove surface ... ... 255·884

Mark on north post of gate in fence crossing footpath from Weobley to Newton, 2·10 feet above surface ... ... 281·079

Weobley parish church: Bolt in wall at south side of door entrance to south-west transept, 4·49 feet above surface ... ... 316·300

Mark on north corner of barn near junction of roads and Willersley toll-gate, 2·30 feet above surface ... ... 216·320

Mark on north-west end of culvert, at junction of road to Kington, 0·86 feet above surface ... ... 227·627

Mark on north corner of Parton Farm-house, at east side of road, 1·38 feet above surface... ... ... 234·562

Mark on east side of east pier of small bridge over Upcot Brook, 1·77 feet above surface ... ... 217·164

Mark on south end of pipe at junction of road, 2·77 feet above surface ... ... 247·970

Bolt in south corner of Kinnersley Church tower, 1·87 feet above surface ... ... 271·511

Mark on top of south parapet of Letton Lake Bridge, 2·01 feet above surface ... ... 234·615

Mark on front of the Halfway-house beer-shop, at N.W. side of road, 0·71 feet above surface... ... ... 273·796

Mark on south-west corner of cottage at north-west side of road, 2·23 feet above surface ... ... 390·617

Mark on south-east corner of Sarnesfield Church, 1·91 feet above surface ... ... 353·426

Mark on end of culvert, at N.W. side of road, near Sarnesfield Court, 1·41 feet above surface ... ... 327·918

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Mark on north-west end of culvert, 52 links from the 9th milestone from Leominster, 1·63 feet above surface ... ... 358·588

Mark on base of chimney of Whitehill Toll-house, at junction of road to Weobley, 2·10 feet above surface ... ... 302·297

Mark on lowest step of stone stairs at junction of footpath to Newton farm-house, 0·82 feet above surface ... ... 334·092

Mark on north-west keystone of small bridge over stream, 0·08 feet below centre of road ... ... 290·541

Mark on large stone in end of culvert at junction of lane, east side of road, 2·82 feet above surface ... ... 291·449

Bolt in buttress at north-east corner of Dilwyn Church, 2·73 feet above surface ... ... 294·224

Mark on end of culvert at east side of road, 0·73 feet above surface ... ... 307·785

Mark on north parapet of small bridge over stream, 0·98 feet above surface ... ... 265·442

Mark on stile at east side of road near Golden Cross, 1·52 feet above surface ... ... 315·821

Mark on east end of culvert at junction of roads, Banistree Cross, 0·58 feet above surface ... ... 322·628

Mark on north front of cottage at south side of road, opposite Monkland Parsonage, 0·99 feet above surface ... ... 286·463

Bolt in north-west buttress of Monkland Church tower, 2·68 feet above surface ... ... 245·562

Mark on second milestone from Leominster, 1·35 feet above surface ... ... 269·546

Mark on approach-wall at junction of cart-road, Corner Cop House, at north side of road, 2·34 feet above surface ... ... 283·250

Mark on front of Baron's Cross Inn, at junction of roads, 2·35 feet above surface ... ... 300·867

Mark on east end of culvert at north side of road, 0.86 feet above surface ... ... 300·798

Mark on guardstone of gate at north-west corner of West Villa, 1·82 feet above surface ... ... 323·748

Bolt in corner of shop at junction of Dishley-street and West-street, 1·11 feet above surface ... ... 264·355

Mark on shop at junction of South-street and High-street, opposite West-street, 1·65 feet above surface ... ... 257·646

Bolt in front of Leominster Town-hall, at S. side of N. entrance, 0·99 feet above surface ... ... 250·478

Mark on south pier of bridge over Pinsley Brook, between Upper and Middle Marsh, 4·77 feet above surface ... ... 232·403

Bolt in corner of the Lion Inn, at junction of Lower Marsh and Mill-street, 2·92 feet above surface... ... ... 238·839

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Mark on north-west corner of Mr. Haskell's shop at Weobley Cross, 2·70 feet above surface ... ... 323·862

Bolt in front of the Salutation Inn, 0·90 feet above surface ... 342·401

Mark on base of wall at gate entrance to police office, Back-lane, Weobley, 1·51 feet above surface ... ... 325·641

Mark on east corner of house, 2 chains west from Roman Catholic Chapel, Weobley, 1·30 feet above surface ... ... 300·799

Stretford Church : Bolt in west corner, 1·78 feet above surface... 288·600

Leominster parish church : Bolt in west side of tower, 2·94 feet above surface ... ... 250·976

Baptist Chapel, Etnam-street; Mark on front, 2·27 feet above surface ... ... 246·097

Town and County Mission-room, Etnam-street : Bolt in front, 1·34 feet above surface ... ... 248·494

Bolt in west corner of Popland's toll-gate, 2·74 feet above surface 234·993

Mark on north-west end of north-east parapet of small bridge over stream at entrance to Rose Cottage, 1·31 feet above surface ... 236·465

Mark on north-east post of gate at north-west side of road, 2·81 feet above surface ... ... 244·779

Bolt in east side of barn at Little Bury farm-house, 2·10 feet above surface ... ... 295·935

Mark on N. parapet of small bridge over stream in Stockton Village, 1·17 feet above surface ... ... 298·527

Mark on upper step of stile at junction of road to Kimbolton Church, 3·72 feet above surface ... ... 368·032

Mark on E. post of gate at junction of cart-road, N. side of road, 2·54 feet above surface... ... ... 504·696

Mark on north gable of Oakcliff House, at east side of road, 2·50 feet above surface ... ... 585·495

Mark on north-east corner of T. Jones's house, at south end of Leysters Village, 1·87 feet above surface ... ... 618·028

Bolt in S.E. corner of Yew Tree Cottage, at N.W. side of road, 1·11 feet above surface ... ... 698·109

Mark on east corner of Raddle Bank farm-house, 2·88 feet above surface ... ... 397·339

Mark on base of chimney in N. gable of Kid Castle, at west side of road, 1·32 feet above surface ... ... 313·283

Kimbolton Church : Bolt in tower at west side of door entrance, 1·85 feet above surface ... ... 415·824

NOTE.—The "mark" consists of a broad arrow cut into the stone and a short line across the point marking the exact level. The "bolt" is a first-class "mark," distinguished by a piece of copper bolt driven into the stone.—E. J. I.

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HEREFORDSHIRE ORDNANCE BENCH MARKS FROM THE "ABSTRACTS OF LEVELLING" PUBLISHED BY THE ORDNANCE DEPARTMENT.

HEREFORDSHIRE PORTION OF THE ABSTRACT OF LEVELLING FROM WORCESTER TO ABERYSTWYTH THROUGH THE TOWNS OF STOURPORT, BEWDLEY, TENBURY, LUDLOW, KNIGHTON, NEWTON, LLANIDLOES, AND LLANGURIG WITH BRANCHES TO TRIGONOMETRICAL STATIONS, &c.

COMMENCED 8TH. SEPTEMBER, 1849. COMPLETED 22ND. NOVEMBER, 1855.

(This line of levels enters Herefordshire about one mile and a half west of Tenbury. It follows, as usual, the coach road, and has branches to trignometrical stations (see previous note). It passes through Little Hereford, and at Brimfield turns northward following the road to Ludlow. From Ludlow it turns westward and re-enters Herefordshire two miles W.S.W. of Bromfield. It passes through Leintwardine, Walford, and Brampton Bryan, leaving the county one mile west of the last-named place.—E. J. I.)

	Altitudes in feet above mean level of the sea at Liverpool.
Mark on front of Richard Heath's house, at west side of road, 1·61 feet above surface	189·882
Mark on front of Joseph Price's house, at N.W. side of road, 0·49 feet above surface....	193·401
Mark on pier of gate near the second milestone from Tenbury, at south side of road, 1·71 feet above surface	198·403
Mark on pier of gate opposite junction of woods, at south side of road, 1·83 feet above surface...	204·300
Mark on pier of gate at junction of road to Little Hereford Church, 1·44 feet above surface	209·177
Mark on east battlement of Little Hereford Bridge, over the River Teme, 1·42 feet above surface	206·998
Mark on pier of gate at north side of road, opposite junction of fence, 1·96 feet above centre of road	215·883
Mark on front of house at south side of road, at Brimfield Cross, 0·76 feet above surface...	225·800

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Mark on pier of Ludford side gate, at west side of road, 2·50 feet above surface ... ... 322·994

Mark on stone wall near Ludford House, at east side of road, 1·25 feet above surface ... ... 326·772

Bolt in north corner of Ludford Church, 1·38 feet above surface 305·774

Little Hereford Church. Mark on front of tower, at main door entrance, 3·06 feet above surface ... ... 203·628

Brimfield Bridge. Mark on west battlement, 0·90 feet above surface ... ... 231·322

Mark on pier of gate at entrance of footpath to Brimfield Church, 2·64 feet above surface ... ... 256·221

Brimfield Church. Bolt in north side of tower, 1·92 feet above surface ... ... 273·350

Mark on west battlement of Ludford Bridge, over the River Teme at boundary of Herefordshire and Shropshire, 1·00 feet above surface ... ... 272·525

Mark on pier of gate, south side of road, at junction of lanes, 1·76 feet above surface ... ... 500·173

Mark on pier of gate, at south side of road, 2·11 feet above surface ... ... 607·207

Mark on old milestone, 5 miles from Ludlow and 11 from Knighton, 1·30 feet above surface ... ... 655·366

Mark on pier of gate, at south side of road, near junction of fence, 1·62 feet above surface ... ... 678·204

Mark on pier of gate, at north side of road, 3·00 feet above centre of road ... ... 749·035

Bolt in front of John Evans's house, at north side of road, 1·96 feet above surface ... ... 804·518

Mark on face of rock, at north side of road, 1·60 feet above surface ... ... 701·953

Mark on front of house, near rope manufactory, at north side of road, 2·54 feet above surface... ... ... 602·226

Mark on stone over gullet, north side of road, at junction of road, 0·22 feet above centre of road ... ... 513·821

Bolt in south-east angle of Mr. Harding's house, at west side of road, Leintwardine End, 2·06 feet above surface ... ... 456·242

Bolt in west side of Leintwardine Church tower, 2·66 feet above surface ... ... 440·035

Mark on east battlement of Leintwardine Bridge, over the River Teme, 1·60 feet above surface ... ... 395·583

Mark on pier of gate, at junction of road to Wigmore, 2·13 feet above surface ... ... 391·660

Mark on pier of gate, south side of road, at junction of fence, 2·74 feet above surface ... ... 395·009

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Mark on south-west angle of Samuel Howell's house, in Walford village, 1·20 feet above surface ... ... 399·967

Mark on pier of gate, south side of road, at junction of fence, 2·52 feet above surface 425.020

Mark on pier of gate, south side of road, at entrance to field, 2·04 feet above surface ... ... 434·180

Bolt in west end of Brampton Bryan Church, at door entrance, 2·65 above surface ... ... 447·043

Mark on pier of gate, at south side of road, 1·70 feet above surface ... ... 459·403

Bolt in front of Brampton Bryan toll-house, 2·80 feet above surface ... ... 462·004

Mark on south battlement of small bridge over boundary stream, between Shropshire and Radnorshire, 0·52 feet below top of battlement ... ... 474·766

NOTE.—The "mark" consists of a broad arrow cut into the stone, and a short line across the point marking the exact level. The bolt is a first-class "mark" distinguished by a piece of copper bolt driven into the stone.—E. J. I.

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The Woolhope Naturalists' Field Club.

The first field meeting of the Woolhope Club was held on Thursday, May 15th, the under presidency of the Rev. James Davies, M.A., of Moor Court. The members mustered strongly, as will be seen by the subjoined list:—Rev. James Davies, Moor Court, President; Mr. W. A. Swinburne, and Rev. R. H. Williams, Vice-Presidents; Mr. Timothy Curley, Mr. John Lloyd, Mr. C. G. Martin, and Mr. J. G. Morris, Central Committee; Mr. R. W. Banks, Colonel Byrde, Rev. G. H. Clay, Mr. J. B. Downing, Rev. W. C. Fowle, Rev. F. T. Havergal, Rev. A. G. Jones, Rev. Wm. Jones Thomas, Rev. H. B. Marshall, Rev. E. J. Owen, Rev. Thomas Phillipps, Rev. C. J. Robinson, Rev. W. P. S. Stanhope, Rev. S. Thackwell, Rev. C. J. Westropp, Dr. Bull, Dr. Chapman, Rev. J. F. Crouch. Rev. E. Du Buisson, Rev. J. E. Grasett, Mr. F. W. Herbert, Rev. J. E. Jones Machin, Mr. James W. Lloyd, Dr. McCullough, Mr. Evan Pateshall, Mr. James Rankin, Rev. T. T. Smith, Rev. F. S. Stooke, Rev. H. W. Tweed, Mr. Arthur Thompson, Treasurer and Assistant Secretary. Visitors: Rev. R. A. Byrde (Ross), Rev. W. Coombs (Titley), Captain Cowtan, Mr. A. Donaldson, Mr. Fuller Craven Fowle, Rev. T. W. Hunt (Byton), Rev. Joseph Hill (Monnington), Lieut. Jones, Rev. C. H. Middleton (Lingen), Rev. G. A. Robins, Rev. Eric J. Rudd.

The day was fine but somewhat chilly, and the arrangements were in every respect unexceptionable. The party met at 10.30 a.m. at Titley station, and from thence proceeded in carriages through the village of Titley to Stansbatch, where they alighted and ascended the steep sides of Wapley-hill, scaling the five-fold line of fortifications by which the camp is surrounded, with a vigour truly Silurian. Dispersing themselves according to their severa fancies, they minutely surveyed the entire area of the camp (now a rabbit warren), tracing the course of agger and vallum, and even testing the flavour of the pond water. A nook at the eastern corner afforded an agreeable shelter from the wind, and here the Club assembled to listen to the President's paper upon

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WAPLEY CAMP, AND ITS CONNECTION WITH THE RESISTANCE OF CARACTACUS TO THE ROMANS.

Wapley Camp, apart from history and tradition, wears every aspect of being a British Camp, and a British Camp of the date of their eventful conflict with the Romans. It is not one of those circular, small, single-ditched "Rings" which represent defensive works between the Welsh and the Anglo-Saxons.* Its shape, situation, ramparts, outer-works, all bespeak an earlier, a Roman invasion, date. Here is the rocky or stony height, atop of which a more or less flat surface of considerable proportions has been enclosed by a formidable agger or rampart of stone and earth, and outside of which on all sides but the north the mounds and ditches are (or have been) five-fold. The shape of this enclosure has been miscalled elliptical, but the map and plan which will accompany this paper, and which I owe to the kindness and zeal of Mr. Fuller Craven Fowle, C.E., will satisfy anyone that it might be more accurately defined as "triangular." A Roman Camp—such as the local talk pronounced Wapley to be until the spirit of archæological inquiry made us more precise—would certainly have been square or oblong, more marked by its distinct gates, and most of all in a hostile country like this, it would have been situate rather upon level ground, for fear of entanglement in mountains imperfectly known to the foreign foe. It would also have been fortifi ed with earth-works only, from default of stone. In similar camps on the Welsh border, like Wapley abiding memorials of a severe and supreme struggle (notably at Croft Ambrey, seven miles or thereabouts to the east), you will find the three sides which are the most assailable and accessible fortified with manifold lines), the innermost much highest and strongest, whilst on the fourth side (for Wapley has a very slight facing to the west, at the vertex of its triangle) which side is, in both these cases, the north, a single entrenchment only surmounts the sharp, sheer steep, which frowns over the vale below, and enables the camp on this hand to laugh its foes to scorn, in its grand, natural strength. At Wapley the sole ancient entrance, it would seem, is, so far as can be traced, to the south. At Croft Ambrey it is to the north-west. And another little difference betwixt the two is this, that whereas at the Ambrey, soil and stone from the interior have plainly been removed from the now uneven and irregular surface to add greater strength to a naturally strong ramgart, at Wapley we find an almost flat table land within the inclosure, as well as a perennial reservoir of water to the south, which might encourage the notion that this fortified camp was rather designed for permanent residence than for a place of resort and resistance in case of sudden attacks, or hard-

* Hartshorne, page 42.

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pressed retreats. This feature, so far as is known, has no parallel in any of the Herefordshire Camps. I concur, however, with Professor Babington, who visited this camp with the Cambrian Archæologists in 1863, on the occasion of their meeting at Kington, in thinking that it was simply the latter, though no doubt there is room enough for British, or, for that matter, Roman huts in respectable number within the barriers. From Mr. Fowle's map and its measurements it will be seen that the camp is about 572 yards in length, and about 330 yards in breadth, at its broadest. But the truth is the geographical position of these border camps bespeaks them the inner line of fortresses for the protection of the Silures and Ordovices against other native tribes, in case of local disturbance of friendly relations, and still more against the foreign invader, who, as we know from the historian Tacitus, eventually forced them with so much loss and difficulty. Mr. Hartshorne in his Salopia Antiqua (a work evincing a thorough examination of the whole subject and topography, as well as orderly thought in systematizing the result of personal investigation), has set down Wapley and Croft Ambrey† as the southernmost of Caractacus's interior line of camps, a line which begins with Hen Dinas, near Oswestry, on the North.

Without aspiring to be a seventh Richmond in the field or to add another conjecture to those hazarded by more or less enterprising antiquaries at this distance of time, as to the site and locale of the last battle of Caractacus‡ I fear I must trouble you to go back with me to that British hero's final and gallant struggle, because it offers a way, in fancy at least, of once again covering Wapley with living forms, less peaceably inclined indeed than the gathering which it beheld to-day, forms, however, from one-half of which, the weaker half, we inherit our love of freedom, whilst from the other and stronger we get our civilization. They are the key to Radnorshire and Montgomeryshire, and before Ostorius could advance into those counties, which I suspect were occupied by the Ordovices, it was necessary they should be forced. I will promise to be brief, but to avoid the possibility of misapprehension I must repeat that I regard Wapley as one of the last entrenched camps defended by Caractacus and stormed by Ostorius on the road to his final struggle.

It was in the year 50 A.D. that Ostorius Scapula, the general sent by Claudius in succession to Aulus Plautius, having suppressed the Cangi, and the Brigantes, north of the Mersey, turned his attention towards the Silures, a people of South Wales, as to whose precise situation it is in vain to attempt definiteness, though Professor Pearson thinks that in early times they must

† See "Salopia Antiq.," page 72. Mr. Flavell Edmunds considers Wapley to mean the "Place of Weapons" (Wap-ley).

‡ The Welshman, Humphrey Lloyd, of Camden's date, considers Caer Caradoc, near Clun, to have been the scene of this battle. Aubrey, Gibson, and others argue for Coxwall Knoll, which General Roy, in 1772, put out of the question by showing that it only corresponded in some points with Tacitus's account, whilst Caer Caradoc did so in none. Hartshorne inclines rather to the fortification on the Breidden Hills, on the N.W. base of which rolls the river Severn; or to Cefn Carnedd, near Llandinam, in Montgomeryshire, also washed by the Severn. But if so, why did not Tacitus give the name of the river with which he was familiar? "Carnedd," by the way, means "slaughter."

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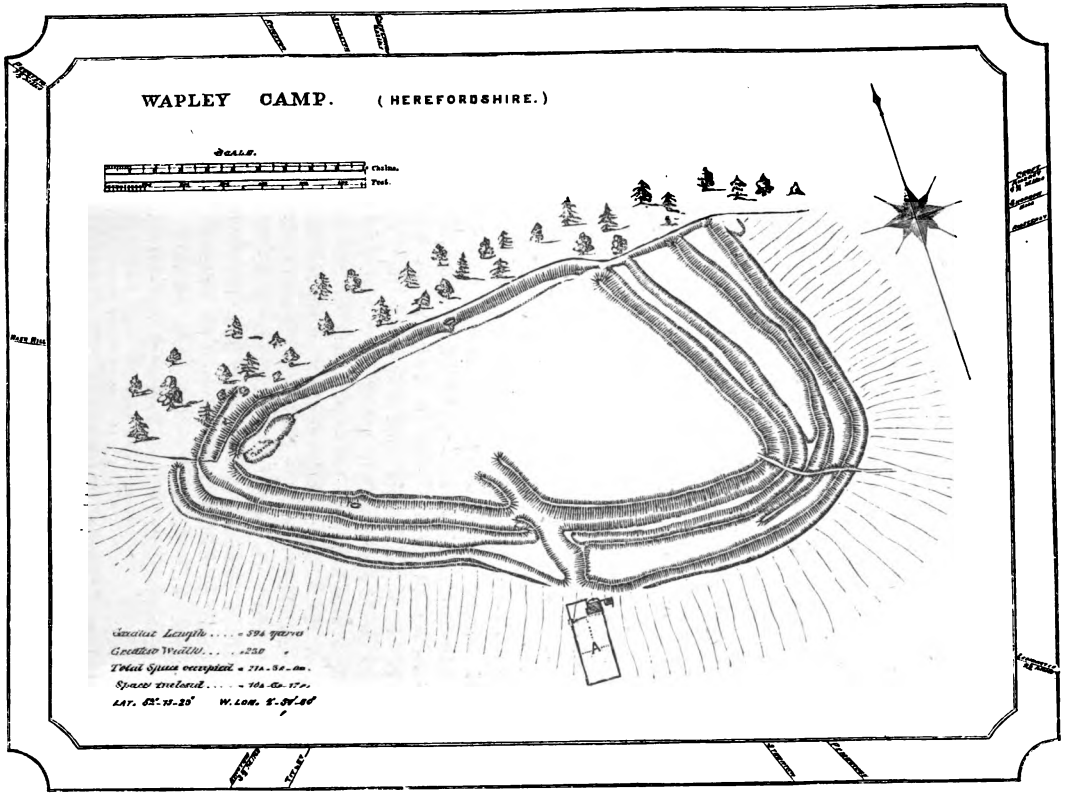

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have stretched from South Wales into Gloucestershire § the territory assigned by Ptolemy to the Dobuni. Whatever their boundaries, their consequence and influence must have been considerable, as may be inferred both from their provoking Ostorius to measures of repression, and from the nature of one of the measures, which, as Tacitus tells us, he used (among others) to effect such repression. He established a Roman Colony at Camulodunum (near Maldon) in the country of Trinobantes (h.e. Hertford and Essex); and this to overawe the Silures, a colony in the east to hold in check a nation of the far-west. The clue to this seeming paradox is that Caractacus was the son of Cunobelin, King of the Trinobantes, a chief who seems to have held an extended sway over the south and centre of Britain, and to have been regarded as paramount in arms by the Celtic races on the Severn and beyond it. So that this colony which Ostorius planted was designed to punish at the centre of Cunobelin's or Caractacus's sway the protracted resistance of the outskirts and extremities. The distance betwixt Maldon and this side of Severn becomes less of a difficulty if we recollect this connection of east and west by kinship and common sovereignty.

At the time, however, with which we are concerned, Ostorius had been constrained to direct his operations more pronouncedly against the Silures, who were both themselves high-spirited beyond their neighbours, and furthermore emboldened by the valour and tried prowess of their leader. Caractacus, it appears, had led out his tribesmen far beyond their native mountains into the opener country, which is now Herefordshire and the valley of the Wye. He had laid waste the fields of the Roman settlers on the Severn and the Lower Avon,‖ that Avon which flows through Somersetshire and Wilts. Ostorius collected his contingents from his various encampments in the Cotswolds, crossed the Severn, and pressed the forces of Caractacus first to their outer line of defences on the Malvern Range, and then, when driven from these with great loss of men and spirit upon the camps of Whitborne and Thornbury in the Bromyard and Leominster district, upon Croft Ambrey and upon Wapley. There were doubtless other points of resistance, probably other points of pursuit and retreat besides and connected with these. Tradition associates Dinedor Camp with the same period, and connects its local name of "Oyster Hill" with the famous Roman general. But from each of the fortresses named there is more or less ground for supposing the Britons to have been driven, and this in the order given. The gate out of which in confused disarray the stormed Silures poured forth from the Croft Ambrey, when they could hold it no longer, is just where we should expect it, if the next point to be made was Wapley.

§ "My opinion is that there were fewer dynasties and people in historical times than would appear from a list of clan names, and that the Brigantes on the north, the Iceni and Trinobantes on the east, the Gaelic Ordovices and the Welsh Silures on the west, and the Damnonii, Belgae, and Cantii on the south, comprise all the names of any real consequence." Pearson, "Roman Britain," page 7. "I am inclined to think," he adds in page 9, "that in early times the Silures must have occupied part of the territory assigned by Ptolemy to the Dobuni, and were probably driven back upon Wales by the Romans."

‖ Tacitus Ann., xii. c. 31.

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I am not concerned with the route and fortunes of Caractacus after Wapley was gained and lost. Driven thence he may have led his diminished but not utterly disheartened forces—who had Claudius's threat of extermination to spur them to extremities of valour—either towards Knighton, near to which are supposed entrenchments of Caractacus at Burrough Hill, Billing's Ring, and Bury Ditches, and where the Roman Camp at Norton enabled the invaders to command the defiles to the east and west; or along the valley of the Lugg which washes the northern base of Wapley, into the Leintwardine open country, where, at Coxwall Knoll, some traditions place the scene of Caractacus's last battle. It may be, that repulsed from Wapley, he divided his forces into two bands,** and that one proceeding Knightonwards, in due time reached the last rallying point by the course of the Teme, whilst the other found it less circuitously by the streams of Lugg. But wherever the last battle was fought there is a certainty that in Tacitus's vivid description of it (33-4) it partakes as to situation, assault and defence, of a character which would be intelligible if we put either Wapley or Croft Ambrey in the place of it, although when final disasters came the Britons had mountain ridges (according to Tacitus) to flee into, whereas in both these places they would have had to descend considerably and to cross streams ere they could regain the fastnesses of their native mountains. Let me endeavour with the text of Tacitus in my mind's eye, to note some common points between the stronghold we see to-day, its occupation, and its storming, and that which the Roman historian records of another and slightly later scene of conflict and resistance.

First, then, of the situation. Caractacus chose a site of such a nature that approach, retreat, everything, was against the invading Roman, and in favour of the Briton on the defensive. Such is Tacitus's express statement. On one side was a steep mountain ridge; on the others where there was smoother, and easier access (si qua clementer accedi poterant) a stone rampart was opposed to the assaulting army. So far there is pretty exact correspondence, as there is also in the river which washes the base of the hill, though as far as the "shifting ford" or "uncertain fordage" which Tacitus commemorates in the words *vado incerto*, this is alike inexplicable in almost every site which antiquaries have pitched upon for the scene of the last battle. I think, however, that the clause which comes next in Tacitus is one which affords more help and light to our present inquiry. He notes that "catervæ armatorum pro munimentis constiterant," which I take to mean that, on the part of the assaulted, crowds of armed men were posted *in front* of the inmost and stiffest entrenchment—in the ditches and spaces between the second and third, and even, as here, the fourth line or "agger." At the first brush this must have been fierce work for the assailants. We seem to see the innermost line surmounted by so-called barbarians, busily plying the javelin, the arrow, and other more

** Pearson considers that the most powerful of British federal kings, Cunobelin or Caractacus, can hardly have exercised genuine control over the services of half a million; and that allowing one in five to be fighting men, it would take weeks to muster them, and the difficulties of a commissariat would be enormous. Page 6.

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casual missiles, over the heads of the occupants of the lower and outer trenches, who in their turn were not only playing the same game, bnt ready with sheer force to meet the brunt of the invading squadrons, should they, unrepulsed by missiles, succeed in getting to close quarters. In the case of two equally-matched barbarian armies it would strike us that the one possessed of so elaborate a vantage would have been the next thing to impregnable. But Roman generals and legions were accustomed to take a rapid account of what could and what could not be carried by assault—"quæ impenetrabilia, quæqua pervia essent"—and relying on their discipline, mode of warfare, and practice in scaling and in siege work, to be slow in concluding that any position was wholly in the first category. And so, as Tacitus shows us, on coming near the "agger" and whilst the fight was with missiles, they would put up with a large proportion and a severe loss of killed and wounded, †† filling up the thinned ranks with dogged endurance and with unremitted vigour of assault. At last the arrowy shower would get so thick and dense that they had to form the "testudo," or *tortoise* or *shed*, a great Roman resource in scaling fortified places, which got its name from the bonded combination of shields, wherewith soldiers tiled their heads, so as to form a scale-like covering. In Rich's "Companion to to the Dictionary" the testudo is described "as a compact covering, like the shell of a tortoise, or the pent of a shed, which was made by raising each shield over its owner's head and shoulders and fitting each shield closely under the shield next to it. Over this pent every missile would slide off without detriment to those below it, and this pent was produced by the outer ranks stooping, while those in front of them stood more and more erect." It becomes intelligible what an appliance this must have been when the struggle came to close quarters for enabling the assaulting party to tear away barriers of rudely piled earth and stones, to breach line after line of defence in succession, and to crush those who manned each of them in hand-to hand encounter; nay, when they came at last to the innermost and most impregnable rampart of all, the odds must have been strongly in favour of the Roman thus shielded as well as equipped in defensive body armour, as against the Britons, who had seen each line in succession broken, who had no body armour to protect them, and whose resistance depended a good deal on fitful discharges of arrows and other missiles, as to which we do not find that they possessed any special skill. If we may trust the Roman historian the result was commonly the same; and could it be re-enacted before us it is probable that so much as we have described of incidents of Caractacus's last battle, wherever fought, would serve for a true and correct representation of how it fared 1823 years ago with Wapley Camp and its defenders, when (howeve much the poet Cowper might seek to redress the balance of odds in the final words of Boadicea's prophecy), the empire of Rome in Britain was brought one step nearer to its accomplishment, and the shame and ruin of its native tribes more irrevocably consummated. It is hard to see what help remained for those who manned the innermost line of

†† Seventy thousand Roman colonists are said to have perished in Boadicea's revolt.

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fortification, when those who were, as Tacitus says, "pro munimentis," or an advanced guard, had been slaughtered—as they must have been, for there was no retreat up a stiff and sheer wall—and served in their slain and trampled heaps as steps to reduce the labour of scaling to the victorious assailants. The utmost that remained was to contest the rampart while they might; and then, while a devoted few delayed the invincible legionaries for a brief space, to pour forth at outlets and by-ways best known to themselves, and flee into the plains below, where they would hurriedly gather their scattered remnants for future resistance, according as pluck and occasion might suggest.

It may be said that this picture is a draught on fancy! Be it so! What else have we to refer to, or to build upon, where the actual facts are so dim, distant, and unrecorded? One object of this brief paper is to provoke inquiry and discussion; to invite a consideration of the British Camps, in which Herefordshire and Radnorshire are so rich, on a system and as a whole; and to stimulate the study and preservation of old memorials, which deserve to be had in honour, not only as monuments of national patriotism, but also as valuable memorials of our primæval history. The scenery over which the eye may range from the vantage-ground of this bold and grand out-look is not strictly within the proposed scope of this paper, and even were it so, I should be afraid that, as a native Silurian, I might, if I ventured upon description, be tempted to picture it too fondly, and with undue prolixity. But I would just remark that, look which way you will, whether upon the wooded knolls and smiling pastures of Herefordshire, or the wilder and more mountainous districts of Radnorshire and Montgomeryshire, traces in considerable number exist both of the Roman invader, and of the bold Briton who resisted him. Of some of the Roman Camps, such as Sutton Walls and Risbury (though these, Mr. Hartshorne thinks, were later works), our club has already discussed the history and the topographic features. On the Radnorshire side, however, there is a large field for the antiquarian in vestiges of the gallant defence, of which Wapley forms a section or chapter. Tomen Castle, near New Radnor, Castell Cefnllys, Caer Ginon, another Tomen near Builth, Castle Ring, South of Discoyd, and Burva Bank, these last within the range of the eye, are some few of the British works, which crown diverse eminences, and recall the struggle of the middle of the first century.

I may just remark for the information of the archæological section of our Woolhopian brethren, that the Cambrian Archæological Association proposes to hold its meeting this year at Knighton, in the week commencing on the 4th of August, when, if they are minded to take the rail and visit that interesting neighbourhood, the result cannot fail to be a better acquaintance with camps and fortifications, Roman and British, than arises from the contemplation of an isolated specimen.

Mr. Fowle, to whom you will all agree with me that the thanks of the Club are especially due for furnishing the first plan, so far as I am aware, that has ever been made at Wapley, has marked upon his plan certain elevations of

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the ground within and without the entrenchments; and he further notes that those within the entrenchments lie east and west, whilst those outside lie north and south. I should be inclined to doubt the likelihood of these being "sepulchral tumuli." But it is a subject for consideration. Upon it, as well as upon the more general topic, I trust that members and visitors will communicate their remarks; indeed, the chief purpose of the paper I have read is to draw forth these remarks, otherwise I should not have occupied your time with a sketch imperfect, both from the nature of the case and its author's limited research and knowledge.

Dr. BULL, after complimenting the President upon the interesting paper just delivered, drew attention to the fact that the camp at Wapley possessed within its ramparts a perennial spring of water—a feature which, so far as the speaker knew, had no parallel in any other Herefordshire camp. At Coxwall Knoll the configuration of the ground was difficult to examine on account of the underwood, but the supply of water there appeared to be derived from two large ponds which were seldom or never dry. Both Wapley and Coxwall were undoubtedly most important British Camps and probably were occupied by the Silurians for some time. Dr. Bull, however, felt convinced that the last struggle of Caractacus was not made at the former place, for the sufficient reason that no trace of any Roman entrenchments could be found in its neighbourhood. Whether Coxwall Knoll, Caer Caradoc, or the Breidden Hill, was the scene of the final encounter between Ostorius and the British chieftain, would perhaps, never be determined to the satisfaction of all members of the antiquarian body. For himself he was in favour of Coxwall Knoll, inasmuch as the extensive Roman entrenchments on Norton Hill and also at Brandon, indicated that preparations for an attack of the greatest magnitude had been made in that particular district.

Mr. R. W. BANKS mentioned that a far larger number of tumuli are to be found along the great Roman road (Watling Street) in the neighbourhood of Brandon than are marked in the Ordnance Survey Map. Bronze implements and arms had been frequently found in the same district.

Rev. C. J. ROBINSON remarked that, although such evidence might be considered weak, it would be natural to expect that the name of so great a chieftain as Caractacus would be associated with the place where his valour was chiefly displayed. Such nominal association is to be found at Caradoc, but not at Coxwall or Wapley.

After the discussion had terminated it was agreed that the next meeting of the Club should be held on May Hill, on the 13th of June. The following gentlemen were elected new members:—Dr. E. Jones (Ludlow), H. E. Moore, Esq. (Hereford), G. V. Banks, Esq. (Much Birch). Some further official business having been transacted, the party descended the hill side and were conveyed to Moor Court, where, through the hospitality and kindness of the President, a hearty and substantial welcome was accorded to them. The keen air of Wapley and a fitting sense of their duties as guests rendered the Wool-

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hopians most ready not merely to do justice to the admirable repast which had been provided for them, but also to join most cordially in the vote of thanks to the host and hostess which Mr. Swinburne and the Rev. W. Jones Thomas respectively proposed.

Dinner over, Dr. BULL announced that in the course of some repairs which had been recently carried out at the Chapel Farm, Deerfold, a few worked stones, apparently the fragments of a lancet window, had been discovered. It seems probable that these stones formed part of the chantry in which Swynderby officiated after his inhibition by Archbishop Courtney. *(See Woolhope Club Proc.* 1868, *p.* 164, *et. seq.)* Dr. Bull suggested that the interests of the Club would be greatly promoted if each member would regard himself as the special observer in the district in which he resided. Advantage should be taken of excavations made in the construction of railways or opening new quarries, and notes made on the spot from immediate observation.

At half-past four o'clock carriages were announced, and the members separated, carrying with them the reminiscences of a very agreeable excursion.

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THE REMARKABLE TREES

OF

HEREFORDSHIRE.

THE WYCH ELM, MOOR COURT.

JUNE, 1873.

This fine tree is situated in the "Paddock," at Moor Court. It is believed to be the largest Wych Elm in the County. At five feet from the ground it measures 19 feet in circumference. It keeps its central axis high into its growth, and the branches droop well on every side, as is the wont of this graceful tree. The trunk is in shade in the photograph, and thus the remarkable columnar buttresses, which distinguish it, are not shewn.

This Photograph is kindly presented to the Club by the President, the Rev, JAMES DAVIES, M.A.

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BOTANICAL NOTES ON THE NEIGHBOURHOOD OF MOOR COURT.

By J. H. DAVIES.

The object of this paper is to give a brief botanical sketch of the district lying immediately around Moor Court. This is principally in the Pembridge district (No. 12) of Mr. Purchas's "Flora of Herefordshire," published in the Woolhope Club Transactions for 1866, but also at Lyonshall runs into the Kington district (No. 11). Geologically the district lies almost entirely upon the Old Red Sandstone, the lower formation. The soil in this district is rich, to judge from the profusion in which wild flowers grow in it, and from the frequency of monstrosites or sports in the commoner plants, a few of which will be mentioned later. On the whole, it may be said that this is a bad botanical district, as there are hardly any really rare plants growing in it, though nearly all the commoner plants are to be found. A glance down the columns of the Pembridge district (in the Transactions for 1866 above referred to) will make this abundantly plain to the botanist, as also will the fact that the percentage of plants from this district which grew in less than 60 of the districts of the London Catalogue of British Plants is very small indeed.

To begin with, we have all the commoner members of the Ranunculus family, but none of any rarity except the Traveller's Joy (Clematis Vitalba). We have the common Barberry (Berberis Vulgaris) marked as growing in 30 divisions in the London catalogue, but this of course is probably not really indigenous. In the Poppy family we have Papaver Rhœas and P. Argemone. We are not at all rich in Cruciferœ, the only one that can lay any claim to rarity being the Whitlow grass (Draba Verna). We have the common Milkwort (Polygala vulgaris), growing plentifully in many places. We have also the Dyer's Weed (Reseda Luteola) in some of our hedgerows. The Caryophyllaceœ are plentiful; many kinds of Lychnis, Stellaria, and Arenaria are to be found, as well as the Spergula arvensis, Sagina procumbens, and S. Apetala. Papilionceœ too are in great abundance; among them may be mentioned as fairly uncommon the Petty Whin (Genista anglica), and the Tuberous Pea (Lathyrus macrorhizus), both marked as growing in 70 divisions in the London catalogue. Among the Rosaceœ may perhaps be mentioned the marsh Potentil (Potentilla comarum) marked 80, and the Bird-cherry Prunus (Prunus Padus) marked 40 in the London catalogue. The common Bryony (Bryonia dioica) 50, grows plentifully in many hedges hereabouts. The Common Marestail (Hippuris vulgaris) has been found in a ditch not far off. The Purple Loosestrife (Lythrum Salicaria) is fairly common by the sides of

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brooks, &c. Linum catharticum is not mentioned in Purchas's Flora as growing in this district, but may be found in a field not far from Broxwood. The Orphine (Sedum Telephium) and Wall-pepper (Sedum acre) have been found here, and Sedum reflexum grows on the Stanner rocks near Kington. The large family of Umbelliferæ are not well represented here. The only members of any variety that grow here are the marsh Pennywort (Hydrocotyle vulgaris), the procumbent Helosciad (Helosciadium nodiflorum) marked 70, the Bastard Stone Parsley (Sison Amomum) marked 50, and the Fool's Parsley (Æthusa Cynapium, 70). Among the Stellatæ, Galium Mollugo, the Hedge Galium (60), Asperula odorata, the sweet Woodruff, growing on the tramway at Kington, and the Field Madder, Sherardia arvensis (80), may be mentioned. Several of the St. John's Wort tribe grow here abundantly; Hypericum quadrangulum, humifusum, pulchrum, may be mentioned as the less common kinds. The common Buckthorn (Rhamnus catharticus) is of frequent occurrence. The Compositæ grow very plentifully, all the common kinds being found here; the only ones worth naming are Gnaphalium Sylvaticum (80), Tanacetum vulgare (60), and Arctium Lappa Campanula latifolia (50), and C. Trachelium, the nettle-leaved Campanula, both grow in Lyonshall-park, and Campanula patula (25) is very common.

The Lucern Dodder-Cuscuta Hassiaca was found a few years ago for the second time in England by Mr. Crouch in a field of Lucern raised from foreign seed at Marston, in the parish of Pembridge, and a full account of the plant and its peculiarities, its earlier history, and a coloured illustration, will be found in an earlier number of these Transactions. The lesser Dodder Cuscuta Epithymum, or Trifolii of Babington, I found plentifully a year or two ago in a field of clover on Cotmore Farm. This, too, was of course not indigenous, but introduced with the clover seed. The common Henbane, (Hyoscyamus niger 70), is fairly common here in the Kington district, and I think I have found it also in the Pembridge. The lesser periwinkle (Vinca minor), I have found apparently indigenous in a wood near here. Polemonium cœruleum grows in the same wood by the side of a small stream, apparently quite indigenous. The Viper's Bugloss (Echium vulgare), has been found here at various times, but not abundantly. The only members of the Scrophularineæ family of any rarity that grow here are the lesser Linaria, (Linaria minor 50), and common Limosel (Limosella aquatica). Of the Labiatæ, the common Scull-cap Sentellaria galericulata may be mentioned. Lysimachia Nummularia (60), and L. Nemorum (80), are of comparatively frequent occurrence.

Of the Orchidaceæ, we have the Twayblade, Listera ovata, the broad Epipactis, Epipactis latifolia, growing in Lyonshall Park; we have Orchis Morio, the green-winged Orchis, the early Orchis, O. mascula, and the spotted Orchis, O. maculata, and the butterfly Orchis, Habenaria bifolia, in great profusion in a field near here. Other plants of comparative rarity growing near here are the Yellow Iris (Iris Pseudacorus), the Naked Crocus (Crocus nudiflorus), the Daffodil (Narcissus Pseudo-narcissus), the black Bryony (Tamus

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communis), the Herb-Paris (Paris quadrifolia), the wild Hyacinth (Hyacinthus non-scriptus), and Lemna gibba and Lemna minor among the duckweeds. The ferns of the district are the common Hartstongue (Scolopendrium vulgare), growing in a hedge near Lyonshall; the common Polypody, growing everywhere; the prickly Shieldfern (Aspidium aculeatum), the male Shieldfern (Aspidium Filia-mas), the hard Blechnum (B. boreale or Spicant), growing profusely in Lyonshall-park; the common Moonwort (Botrychium Lunaria), the Bracken (Pteris aquilina), Asplenium Trichomanes, A. Adiantum nigrum, and A. Ruta-muraria, and Polystichum angulare.

I have before alluded to the frequency of monstrosities or sports among many of the common hedgerow plants, and more particularly have I noticed these among primroses. You can seldom or ever pick a handful of primroses without getting three or four specimens that have sported; either the calyx has foliage leaves instead of the ordinary sepals or we have inside the tube of the corolla a second tubular corolla growing out of the first one replacing the pistil. Sometimes these double and treble varieties have still inside the innermost corolla the proper complement of stamens and pistils. I possess as many as 20 different sports of the primrose, all from perfectly wild localities. Again this is true of the common buttercups especially Ranunculus Ficaria hereabouts, continually in definite stamens, half petals half stamens occur, and similarly a gradual shading off from sepals into petals is often noticed. These are only instances of a common phenomenon, which, however, has considerable interest as supporting the idea—theory shall I call it—that foliage leaves, sepals, petals, stamens and pistil are all alike forms and developments of a typical leaf-form; and that they are therefore easily interchangeable. Such is the very rational theory founded on the observation of, and to explain facts like these above mentioned. I found this year a very good illustration of this theory in a monstrous specimen of wild mustard picked in a turnip field, halfway up the root-stem of the plant the stem thickened to double its size, above the thickening came out foliage leaves arranged like the sepals of a crucifer; inside them were four thick green leaves more than inch and a half long and an inch broad, arranged also as a crucifer, but bearing no resemblance to petals except when one looked at the inside where just at the base was a little yellow strip up the inside for about a quarter of the length of the monstrous petal; the stamens were six in number inside the petals, but two of them were half developed as foliage leaves, and inside them in the place of the pistil came the continuation of the stem bearing more flowers of the ordinary kind. This theory, which I have seldom seen mentioned in text-books or botany, I have found of great use in explaining to students the nature and relation of the calyx corolla, &c., side by side with that of foliage leaves.

An interesting sport occurred in our garden on a laburnum tree. On the same tree were growing the yellow and violet varieties, but oddly enough, one of the shoots about 7 inches long, bears only sessile violet flowers and leaves instead of the ordinary drooping bunches; the flowers are placed along this

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branch with leaves intermixed, and it is certainly very curious. As a member of the Woolhope Club I ought to know all about the fungi of the district, but I know little or nothing, having never been at home in the best time for fungus hunting.

The mistletoe grows here very plentifully as in Herefordshire generally, and it may be interesting to mention the trees upon which I have found it. They are the Poplar, the Apple, the Hawthorn, the Pear, the Mountain Ash.

Finally, I must briefly notice the trees of this neighbourhood. Elms appear to flourish very well indeed here, attaining considerable height and size. Several about the house measure as much as 12ft in girth and two exceed 14 feet. We have a Wych Elm in a field adjoining the house measuring 18ft. 10in. We have a very fine Silver Fir some 120ft. in height and measuring 11ft. 8in. at 5ft from the ground. Walnuts seem to flourish well too, the short avenue in front of the house contains some fine trees, the largest measuring 12ft. 3in., and reaching 70ft. in height. Oak grows to a very fair size, though we have none giving very striking measurements. Most of the timber trees in fact seem to do well, if we except the birch, which is conspicuous by its absence throughout this immediate neighbourhood.

In concluding, I must apologise for the necessary dulness of this paper—a botanical paper must necessarily be dull to many readers—and this is so, I fear, even to the botanist. If, however, he would come and botanise the district he would, I think, find several things to reward him, and for the unbotanical reader, I can promise that if he be a lover of Nature at all, he would not be disappointed by a sight of any of our hedgerows in the months of May or June. For profusion of flower and richness of colour, they are, I believe, unsurpassed in England, certainly in any part I know.

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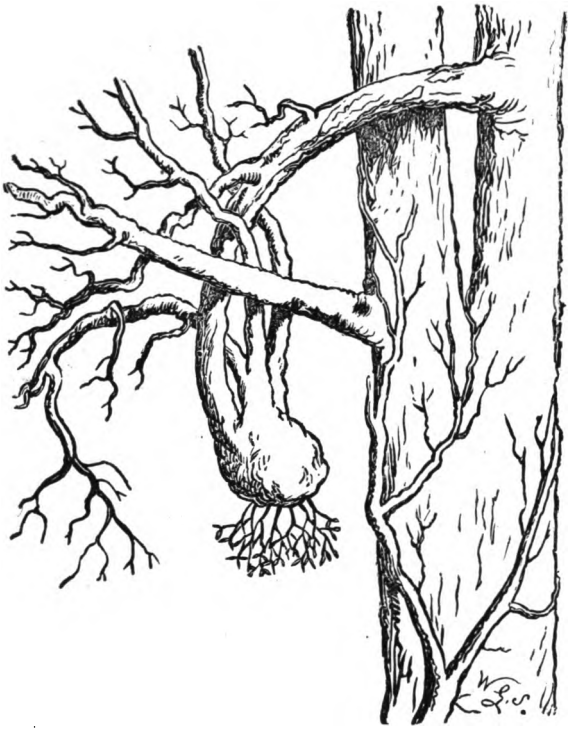
THE REMARKABLE TREES

OF

HEREFORDSHIRE.



BRANCH OF LIME TREE DISTORTED BY MISTLETOE.

HOLME LACEY GARDENS, HEREFORD, 1873.

Two of the Lime Trees in Holme Lacey Gardens are singularly affected by Mistletoe, and are rapidly being killed by it. A knotty excrescence is formed where the Mistletoe has taken root, and the growth of the pendant bough is turned directly backwards on itself. The illustration shews one of twelve pendent boughs which were similarly affected on the same tree.

Sketches by Worthington G. Smith, Esq., F.L.S., in "Gardeners' Chronicle."

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The Woolhope Naturalists' Field Club.

EXCURSION TO MAY HILL AND ROSS.

On Friday, the 13th of June, undismayed by the unpromising aspect of the weather, the Woolhopians mustered at the Barr's Court Station to the number of 20, and took advantage of the Hereford and Gloucester 9·45 a.m. train for transit to Longhope. At this station their number was reinforced by the Rev. Mr. Jones, of Westbury, and the Revs. — Price and White, and after a pause to await the train from Gloucester—which it was supposed might bring an extra contingent, and possibly the Rev. W. Symonds, who had undertaken to guide the Club to May Hill, as well as in a partial examination of a quarry near the station—the President and members present made their way, under a serener sky than they had anticipated, by a shady lane and across the turnpike road to the upper ground, where May Hill proper commences. As they were anxious to effect a junction as soon as possible with Mr. Symonds, the pedestrians did not tarry long at the broken and contorted quarry near this point, but pressed on until near the picturesque clump of Scotch firs which surmount the hill they hailed their guide and lecturer, who, accompanied by Miss Jardine and his son, had ascended the hill from Newent. Although about this time certain ominous thunder claps foreboded storm, and counselled the expediency of Mr. Symonds's address being delivered "in the dry," if possible, the Club were enabled to make a rapid preliminary survey of the magnificent panorama so well and succinctly described in pp. 146-7 of the "Records of the Rocks." The force having been recalled to consistency by Mr. Thompson's bugle, Mr. Symonds then delivered a most interesting lecture, in which the geology, topography, archæology, and legendary lore connected with May Hill were happily set forth :—

May Hill is a somewhat celebrated locality to the geologist inasmuch as the May Hill Rocks are a synonym for that important group of beds which lie at the base of the Upper Silurian deposits, and which constitute the Upper Llandovery Rocks of Murchison and the geological surveyors. The name "May" is believed by some to be derived from "Maia," the mother of Mercury, known to Roman times; and by others to the fact that in bygone days the merry makers from Gloucester danced upon the green, where now stand the Scotch firs planted upon its summit, as some say, to celebrate the Restoration of King Charles II. The geology of May Hill may be briefly described as very similar to that of Woolhope, inasmuch as no older rocks are exposed

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to the examination of the geologist than the May Hill rocks or Upper Llandovery Pentamerus beds with their peculiar and distinguishable fossils. I think it very probable that a railway shaft driven through the centre of the hill, say from Longhope to Huntley, would expose rocks of Lower Silurian, Cambrian, or even Laurentian age, as we know that Laurentian rocks enter into the structure of the Malvern Hills, a few miles to the north of May Hill, and we also find the May Hill or Upper Llandovery deposits laid down unconformably over and against older rocks, as at Church Stretton, the Wrekin, and many other localities. The oldest rocks, however, as exposed to view are the dark greenish beds with veins of quartz seen near the village of Huntley close by the road. These are now known to be of Llandovery age, although once supposed by Sir R. Murchison to be Cambrian rocks, for some years since Lingula Parallella, a characteristic Llandovery fossil, was found in them by Mr. Turner, formerly a schoolmaster at Pauntley. Pentameri, Stricklandinia lens, and Linguleæ, all common fossils in these strata have been found in the beds where they are quarried, a little south of the circlet of Scotch Firs. The Woolhope limestone, which in the valley of Woolhope, Malvern, Ledbury and other districts overlies comformably the Llandovery rocks, is but poorly exposed on the flanks of May Hill. It may be seen, however, as a mass of nodules and shales on the road from Huntley to Mitchaeldean and Ross. The Wenlock limestone is and has been extensively quarried in the picturesque woods you see on the east between the summit and the vale of Newent, and known as Ristley Wood and Jordan's Wood; while turning to the west we see a long north-western prolongation from Blaisdon on the south, where the Wenlock beds rise sharply from the Triassic rocks of Leigh-park and Birchengrove to Aston Ingham on the north-west, where they abut against Old Red Sandstone. The characteristic fossils are numerous, some of the shells being covered with corallines, and the collector may obtain some beautiful specimens by searching among the shales in the old quarries. The Aymestrey limestone and lower Ludlow shales appear to have thinned out much in the May Hill district; nevertheless both may be studied on their uplifted strike, south-east of Flaxley-abbey and near to a remarkable fault, where Ludlow and Aymestry rocks are faulted against Old Red Sandstone on the Flaxley side, and new red marls and keuper sandstone on the other at a place called Grove Farm and Broughtons. Years ago I accompanied Mr. Strickland to a section of the Ludlow bone bed, which he had detected in the railway cutting at Flaxley, and on other occasions I have found there remains of Pteraspis and Scaphaspis, both Silurian, and lower Old Red forms of fish. The Upper Ludlow shales are passed just east of the Longhope station and they contain Chonetes lata and Serpulites longissimus with other typical fossils. The passage beds are exposed on the east side of May Hill as well as on the west at Flaxley, at a place called "Clifford's Meend" or "Mine." East of Clifford's Meend, also, there are coal measures brought to the surface at Bowlsdon, and which are faulted between the Old Red Sandstone of Acorn Wood and the

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Trias of the Moat and Southends. The proximity of these faulted coal measures to the great upthrow of May Hill, renders their economical value, I fear, as nil. Looking still to the east, and towards the churches of Taynton and Tibberton, we see the Wenlock mass of Jordan's Wood. From this Silurian ridge there dip away some Permian breccias, or, at all events, breccias consisting of angular glazed pebbles, similar to those of Haffield and Worshill, and which are supposed to be of Permian age. At all events, these breccias lie at the base of the Trias, and are overlaid by the Red Bromesberrow (Bunter) Sandstones and the Waterstones of the Trias. This district is especially interesting to those who love the lore of physical geology. The Old Red Sandstone on the eastern side of May Hill occupies a large portion of the forest-looking district called Newent Woods; while on the west it lies in the hollow between May Hill and the Forest of Dean coalfield, stretching away westward to Weston-under-Penyard, Ross, and the great Old Red district of Herefordshire and Monmouth. As you may suppose, there is a great squeeze between May Hill and the coal measure rocks of Drybrook above Mitcheldean; nevertheless, the Cornstones may be seen *in situ* by Bilbut and Landgrove, west of Longhope, while the Old Red Conglomerates and Yellow Sandstones of the Upper Old Red are seen near Drybrook to support and underlie the carboniferous limestone of Dean Forest. Such are the broad, plain, geological features of the country around May Hill. We will now allude to the more distant country around us—its geology, scenery, and historical lore. Looking northward we see how the scenery of the country is diversified by the bold chain of the Malverns, which rise almost precipitately from the plains of the Trias on their eastern flank, whereas, on the westward, the wooded Silurian and Old Red hills of the Ledbury country, rising sharply against the sky, tell us of the earthquake movements which, in times long past, elevated the Silurian sea beds and the Old Red deposits above them, above the Triassic plains on the east; and how the Malvern hills themselves represent a focus, as it were, of earthquake action which elevated the strata on the west of their flanks, and threw down the equivalent rocks on the east. Directly in front rises the weird hill of the Ragged Stone, weird in more senses than one, for in geological times, when the volcano of Cader Idris poured forth its lava and ashes into seas tenanted by crustaceans and shells of the Lower Silurian Lingula Flag period; there was an active volcano, with its crater above the waves, where is now the site of the Ragged Stone, and which enveloped the tiny oleni and trilobites of the Black shales in hot currents of lava, or smothered them by the sudden deposition of volcanic ashes. Weird, too. are the legends connected with the shadow of the Ragged Stone, as for a short time during Midsummer evenings its long dark shadow is projected over the vale. It rests awhile, like a long cloud in the evening sunshine, over a spot where the Danewort *(Sambucus Nigra)* tells of the massacre of the Danes by Athelstan, and the bloody reprisals that followed in the burning of the church of Deerhurst and the flight of its Prior to Great Malvern, where he founded the chapel of St. Ann's. It throws its shadow over the ancient Moreton Court, the home for centuries of the Nanfans

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and reminding us of the legend how Wolsey remembered on his deathbed, the prophecy that warned him of the shadow that falls on those "who trust in princes rather than God." Its shadow has been seen creeping over the field of blood (bloody meadow), where, near its base, Giles Nanfan ran his friend and sister's lover through the heart in the days when the "merry Monarch" ruled in Britain; an old, old tale, of love, and death, and sorrow! There is another shadow, too, connected with the history of the Ragged Stone, which has never quite passed away from the hearts of some of us. I mean the shadow that came over us when we remember how one we loved and respected, told us from the summit one bright summer's day, nigh 20 years ago, of all wonders of Geology connected with this Planet's history; and how ere the autumn had come, our friend and preceptor was laid among the green graves of Deerhurst in the vale. That trap-dyke which rises so abruptly on the west flank of the Ragged Stone, runs right through the chain of the old Laurentian gneiss, from the Chase-end hill on the south to the Worcester Beacon on the North, and having been infiltrated into and through the old gneiss alters its dip and strike, and often reverses the beds themselves. It runs from S.E. to N.E., and nearly follows the trench struck by the Red Earl of Gloucester, who, on his dispute with the Bishop of Hereford about the right of forest chase, declared—"By the splendour of God" "That if ever he caught an adherent of the Bishop's in chase of hart or stag across the dyke he digged, that churl should lose his right hand." Time would fail me if I said more of the Malvern hills and their ancient encampments on Midsummer-hill, and the Herefordshire Beacon. Suffice it to say that both are remarkably well preserved in a country where, owing to agricultural changes so much of the historical records of other days has necessarily been destroyed. Leaving the Malverns, and turning to the north-western, we see a great upcast of Silurian rocks, through Old Red Sandstone at Woolhope and Stoke Edith, of which upcasts indeed, May-hill is a prolongation. Behind Woolhope in the distance rise the Clee Hills with their volcanic rocks, and their outliers of coal measures, evidences of the wondrous geologic history that those coal measure rocks with their Mill Stone Grit, Carboniferous limestone, and underlying Old Red were once connected with mountain peaks as distant as Pen Cerrig Calch on the Black Mountains and the Blorange above Abergavenny. Look well upon those points to the westward where the Welsh mountains peep out in the distance, for those hills are to the geologist impressive truths of the extraordinary amount of denudation that has gone on above where now are the plains of Herefordshire and Monmouthshire, and of the way in which scenery is determined over large tracts of country, not by subterranean movements but by the erosion of hundreds of feet of solid rock which were once continuous with the rocks of the Clee Hills, and the rocks of Dean Forest, from above localities where now stand the Cathedral city of Hereford and the dwelling places of the Briton, Roman, Saxon, and Norman, in the broad plains of the Lower Old Red. Westward again and near at hand we have the town of Ross, above which rise hills of Upper Old Red Sandstone strata which were once continuous with the distant peaks of the

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Brecon and Caermarthen Vans, the Sugar Loaf, and Black Mountains. We look upon the site of the Roman Ariconium and beyond the wooded knolls in the foreground we behold a district famous for its strongholds of Wilton and Goodrich Castles; and the wild scenery of the Wye now famous for its bone caverns, the haunts of the cave lion and hyena in days when the mammoth and hairy rhinoceros roamed over the Forest of Dean, and when a wild hunter race of men chipped their flints and sometimes sheltered in the recesses of Arthur's cave. Then facing us still on the west is the Forest of Dean, a great outlier of the coalfield of South Wales, which it resembles in geological structure so closely that no one can doubt the former continuity of the strata, rock to rock. Here in the Royal Forest several of our kings loved to chase the wild boar and the stag, and it was when hunting there that the Conqueror swore the deadly oath that he would exterminate the Northumbrians. In its recesses the wretched Edward II. sheltered for a while before he was dragged through Ledbury to his prisons at Kenilworth and Berkeley, which latter spot we look upon right across the Severn sea, nearly south from where we stand beyond the white waters of those ancient straits. Lastly, I must once more direct your attention to the north-east and east, where the eye wanders over the fertile vales of Worcester and Gloucester. The geological formation of the vale is due to a great downthrow of the older formations east of the Malverns in Post Carboniferous times, and this great fault extends all the way from the mouth of the Severn estuary by Cardiff to the mouth of the Dee and the Irish Sea. Over the downthrow Palæozoic strata of the vale and fault we know that the triassic and perhaps some of the upper Permian deposits were laid down unconformably; and the flat lands that you see stretching away to the Cotswolds are mostly triassic beds, the older or bunter beds only appearing through denudation at the surface as you approach towards the Malvern or May Hills. Here and there, where you see low hills rising from the plain the lower lias comes on, and in several outliers, as at Sarnhill, near Tewkesbury, and the Berrow-hill, near the Malvern Chase end hill, cap the upper marls and Rhotic beds. The large hill of Bredon is a great mass, principally of liassic deposits, upper, middle, and lower lias, capped at the summit by beds of inferior oolite, showing us how the oolitic rocks were once continuous from the Cotswold to Bredon; and looking at the lias outliers between the Cotswolds and the Malverns we can have little doubt extended to the Malverns themselves. We must not suppose, however, when speaking of the downthrow of the Palæozoaic rocks along the Malvern fault in Permian times, that such faulting formed the great Vale of the Severn. This vale was once filled with liassic and oolitic rocks to the height of the Cotswold ranges, and denudation excavated the hills of Bredon and Dumbleton, and Robin Hood, where it rises above Gloucester, and stripped off the oolites from the lias, and the lias from the red marls below. All these hills, and many others, are monuments of the denudation left by nature as proofs and measures of the amount of excavation that has gone on. And this denudation, through the agency of sea waves, and waters, and currents, and ice

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masses floating down those currents, and by river action since the sea passed away, and by atmospheric changes going on through untold ages, has moulded the hills and dales, and rocks, and crags as you now behold them. In comparatively late geologic periods too this beautiful vale was filled with the rolling waters of a great marine strait, and you might have sailed from the mouth of the Severn to the mouth of the Dee, and the sailor over those seas would, if he had landed on the coasts of the Malverns and Siluria on one side or the Cotswold on the other, have seen the mammoth, the Irish elk, and the reindeer, browsing on an Arctic vegetation, and perchance been in danger of the cave lion or the still more ferocious tiger, the great Macharrodus. The men he would have met with were probably as wild as the present race of the Esquimaux, and their coracles floated above the sites of Worcester, Tewkesbury, and Gloucester. They have left their weapons and rude implements in many a cave of Western England buried with the bones of the wild animals which lived on those old shores in thousands, and some of which no doubt often preyed on them. These our early British ancestors have passed away for ages, and with them have gone the strange wild animals that once frequented Great Britain; the Severn straits have become the fertile vales you now behold; the climate has changed; the vegetation has changed; the scenery has changed; and if one of those old Britons could look now with us over the distant country he would wonder indeed at the marvellous alteration that has passed over the land and waters of his youth. He would see towns and furnaces where once he hunted the mammoth and the elk, and spires rising amid the busy haunts of men, where in his time there rolled the waters of the Severn sea; Deerhurst, the early home of the Saxon race, burnt by the Danes after the massacre by Athelstane; Pershore, the home of Odo and Dunstane; the battle-fields of Worcester and Tewkesbury; the old Glevum of the Romans, where now you behold rising the splendid Cathedral of Gloucester; Bristol, with its marts and ships and teeming multitudes, were all then below the waters that washed the shores of the Cotswold Hills and Malverns, when the old hunter to whom I have alluded chipped his flint weapons in Arthur's Cave above the silver Wye. Such are some of the wondrous changes that have occurred since our British forefathers roamed over these early lands and floated their coracles over bygone waters. Is any romance more wonderful than these bygone records of our planet's history?

At the close of Mr. Symonds's address, during which the weather propitiously held up and during one portion of which the clouds cleared away, and the sun shone out above the Cathedral tower and the shining roofs of Gloucester city (as if the good old city smiled upon new folk a-maying on May-Hill), the President, the Rev. James Davies, in the name of the club, briefly thanked Mr. Symonds for his able and graphic address, and congratulated him upon the comprehensive grasp of geology and other collateral sciences which he had acquired since the days when they two, as he might say, were students together in the classic groves of Christ's College, Cambridge. Mr. W. Swin-

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burne, a vice-president of the society, seconded the vote of thanks, which was carried by acclamation; and Mr. Symonds, in his acknowledgements, congratulated the Woolhopians upon their rank and prowess among "field clubs," suggested the individual devotion of the members to the examination of the geology, botany, and archæology of their several localities, and strongly urged the great importance, when the "locus in quo" of a museum was provided at Hereford, of making it the repertory and the sanctuary of the typical fossils of the district embraced by the club. After a little lingering upon a vantage-ground, new to many of the members present, the club parted with Mr. Symonds, and descended the hill through clayey lanes, and characteristic orchards, until it reached a way-side "public" yclept the "Farmer's Boy," where vehicles were presently at hand to convey the members to Ross. This transit was so speedily effected, in spite of the rain which had come down with a will, after May Hill was left behind, that time sufficed for a visit to the church of Ross before dinner. Its fine spire and monuments, and other characteristic features were examined, and dreams and speculations were rife as to its future restoration.

Dinner was served at four o'clock to about 20 Woolhopians, the Rev. H. T. Hill, of Felton, joining the party, though he had been unable to undertake the excursion. After the dinner, which reflected credit on "mine host" of the "Royal," the business of the club was transacted. The following gentlemen proposed for membership at the Wapley meeting, were duly elected:—Mr. G. V. Banks, Birch House, Ross; Mr. Martin, architect, Hereford; Mr. Richard Done, Pont Faen, Hay.

A discussion arose and interrogatories were put to the President, in reference to the publication of the transactions for the year 1872, as well as the re-publication in a more solid fashion of those for the year 1871.

Mr. Davies explained that at the annual meeting in January an Editorial Committee had been appointed, on which Mr. Rankin, Sir George Cornewall, the Rev. S. Clark, the Rev. C. J. Robinson, with himself, had consented to act, but that such committee dated only from the time of their appointment, and, as far as he knew its mind, was loth to charge itself with retrospective duties, considering that it was safer financially and editorially to start fair with the transactions of the year 1873.

It was then represented that unless something were determined with reference to the Transactions of 1872, valuable papers, such as that of Mr. Johnson, at the Malvern Meeting, that of Mr. Lees, and that of Mr. Adams, on the Pontypool Coal Field, as well as Mr. Isbell's Metereological Tables for the year, would be allowed to remain unpublished, to the great loss of members interested.

Eventually it was proposed by Mr. Hereford, seconded by Colonel Symonds, "That Mr. Fowler should be requested to audit the Accounts of the Club, and that, if the Funds allowed it, an endeavour should be made to arrange for the publication, in a single volume, of the Transactions and Papers of the years 1871 and 1872."

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As a rider to this proposition, Mr. SWINBURNE, Vice-President, suggested and proposed "That the Editorial Committee be requested to provide for and undertake the publication of the Transactions of 1871 and 1872, it being understood that the members would cheerfully supplement their annual subscription by a head tax to meet the temporary need, if it were found to exist."

The PRESIDENT undertook to communicate the views of the Club to the other members of the Editorial Committee, and hoped that they would be able to report upon the subject at the meeting on the 11th of July.

The photograph of the elm tree at Homme End, presented to the Club by the Rev. William Poole, and taken by Messrs. Ladmore was handed round, and it was announced that it would be ready for the new volume as soon as the mounts were printed.

Mr. HEREFORD kindly volunteered to present the Club with a photograph of one of his fine trees, as a contribution to the record of the Representative Trees of Herefordshire, and his offer was accepted with enthusiasm.

The Rev. T. T. SMITH then exhibited a flint implement of the neo-lithic period, recently sent to him from the mountains of Carnarvonshire. He glanced at its beautiful adaptation to the hand that would have had to ply it, drew attention to the peculiar rounding off of the nearer edge, and suggested, from experience of the habits of the North American Indians, that its use and purpose was for skinning animals.

The Rev. H. COOPER KEY believed that the implement exhibited was of horn-stone, and not basalt.

Mr. SMITH promised, at a later period, to communicate a more detailed account of this implement for publication in the transactions.

The PRESIDENT announced that a block of the plan of Wapley Camp, exhibited at the Wapley meeting, was being made by Mr. Dallas, of 234, Gray's-inn-road, London; so that engravings of it would be forthcoming at the proper time.

The Club then left the hotel for the Ross station, and took the 7 o'clock train for Hereford, thence dispersing to their different destinations, agreeably surprised at the falsification—in the main—of the weather's morning "unpromise," and highly satisfied with their achieved excursion to May Hill.

The following members and visitors were present:—Rev. James Davies, President; Rev. H. W. Phillott and Mr. W. A. Swinburne, Vice-Presidents; Mr. Curley, Mr. C. G. Martin, and Mr. J. G. Morris, central committee; Rev. W. S. Symonds, Mr. H. G. Apperley, Mr. H. G. Davies, Mr. J. B. Downing, Mr. J. T. Owen Fowler, Mr. Richard Hereford, Rev. H. T. Hill, Rev. H. Cooper Key, Rev. E. Palin, Mr. T. Clifton Paris, Mr. Alfred Purchas, Rev. T. T. Smith, Lieut.-Colonel Symonds, Mr. Arthur Thompson, treasurer and assistant-secretary. Visitors: Rev. R. H. Cobbold, Ross; Rev. C. J. Jones, Westbury-on-Severn; Mr. J. E. Norris, Hephill; Rev. A. H. Price, Lugwardine; Mr. F. Symonds, Pendock; Rev. T. R. White, Little Dewchurch.

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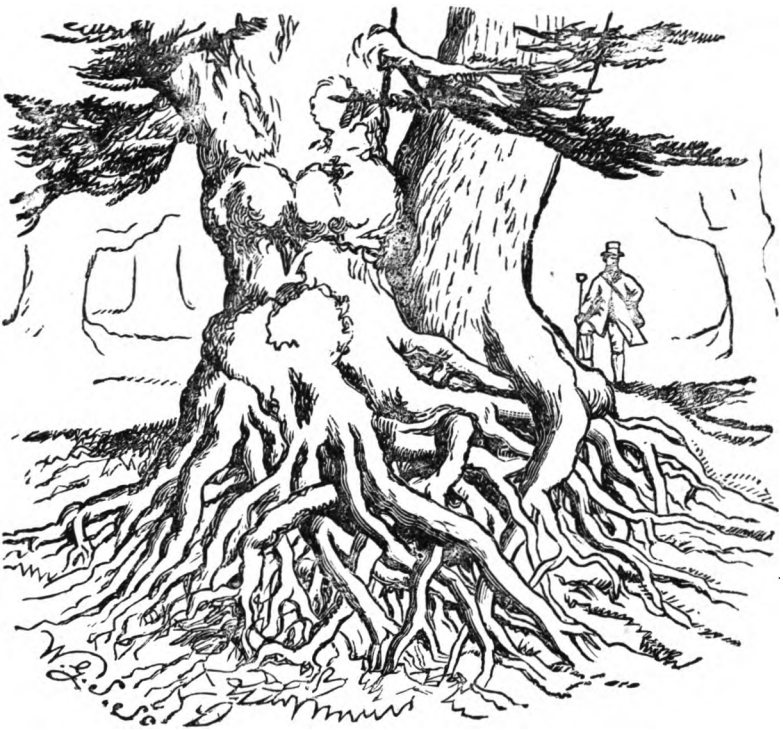
THE REMARKABLE TREES

OF

HEREFORDSHIRE.



YEW AND ELM.

HOLME LACEY PARK, HEREFORD, 1873.

The appearance of these Forest Trees is most striking. As seen in this sketch, with their roots intertwining, they remind the spectator of two giants violently struggling together. On the other side they seem to grow from a single stem. As might be expected, the tall Elm is dead, and the top of its perfectly naked trunk is thrust high above the foliage of the victor Yew– like an arm of the vanquished appealing for mercy.

Sketched by Worthington G. Smith, Esq., F.L.S., for "Gardener's Chronicle."

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The Woolhope Naturalists' Field Club.

LADIES' DAY.

LUDLOW—RICHARD'S CASTLE, AND HAYE PARK.

On Friday, July 11th, the Woolhope Club mustered strongly at the Barr's-court Station, with provision-hampers, and—a churlish naturalist might have said—other "impediments," to take the 9.20 a.m. train to Ludlow. The goodly number of ladies arrayed in bewitching varieties of "Dolly Varden," "Brown Holland," and "Ticking" costumes, bespoke at once the meeting of the year when absorbed naturalists are conspicuous by their absence, but the rank and file of the club compound for the lack of severer quest of matter connected with the "ologies" on condition of being allowed to introduce ladies to the excursion by special ticket and to give the day's march the character of a pic-nic. The party was increased by contingents from Leominster and the neighbourhood of Kington, and on reaching Ludlow station, where it was met by the President (the Rev. James Davies) numbered from 56 to 60. Carriages and breaks were ready to convey the company direct to Richard's Castle Church, the first point of interest, and here was met by Walter S. Broadwood, Esq., the present tenant of Moor Park, and Alfred Salwey, Esq., the representative of the ancient family to which Moor Park, Haye Park, and the chief portion of the locality marked out for the day's excursion has for two centuries belonged. After a brief exposition of the programme by the President, who communicated to his audience Mr. Broadwood's generous permission for them to traverse the richly-wooded valley of the Haye Park under the guidance of himself and a keeper, and his desire to add to the comfort and pleasure of their proposed pic-nic by providing them a tent and otherwise supplementing their commissarial department, the curious old church of Richard's Castle was visited, the detached belfry duly examined, and the painted glass, ancient monuments, and ancient stone coffin lid in the interior of the church carefully noted by the archæologists and ecclesiologists of the party. The next move was to the castle, erected in the reign of Edward the Confessor, of which the walls and towers, going to ruin in Leland's day, are now reduced to one or two mere fragments surrounded by luxuriant wood, and almost inaccessible to the passer-by. A longer halt was made in the vicinity of the

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castle, and a little below it, at the Bone-well, which was known to Camden, and commemorated by Drayton in his Polyolbim as

That prodigious spring
That little fishes' bones continually doth cast.

The poet dear to tourists and pedestrians was wrong about fishes, and should have written "frogs," as it is now generally agreed, and as was pointed out by Sir Roderick Murchison, who says that "this phenomenon results from the usual sloping position of the Ludlow rocks, which, while it desiccates the higher parts of the ridges tends to produce natural springs near the foot of these inclined planes wherever the strata are affected by faults near the junction of the rock and Old Red Sandstone. The faults however act more particularly as dams to the water and occasion springs." (Siluria, 1st Ed., p. 250). We were permitted to inspect some of the minute bones which had been gathered from the well, and heard a discussion on the best mode of skeletonizing a frog for the purpose of comparison.

Leaving the Bone Well, which a classical traveller compared to Egeria's grotto, the club proceeded up the dingle across Hanway Common into the Haye Park, pausing in groups to notice the P. Dryopteris (or oak fern), and the P. Phegopteris (or beech fern), rarer than formerly in this favoured demesne through having suffered many things of many too ardent naturalists, though at the close of the day the President of the Woolhope Club had the satisfaction of believing that his allies and followers on this occasion had respected his earnest injunctions, and kept their trowels in their pockets or knapsacks. Of ferns indeed and wild flowers, soft turf and sunny dells, and lovely woodland scenery there was no lack, and the day, neither too hot nor too cool, favoured the ascent of the Comus Dingle by the pedestrians, whose groups and knots added to the effect of the landscape, until at length they reached an appointed rendezvous near a large and shattered ash, where in the vicinage of Haye Park House was erected the tent for the lunch, and where, before that interesting ceremony, the following letter from the Rev. C. H. Myddleton was read:—

Lingen Vicarage, Presteign, June, 1873.

My dear Sir,—I have made a few rough notes since I came here which are very much at your service, and as no observations honestly made are really worthless to a naturalist, mine are offered through you to your Club as a contribution towards that exhausting series of Transactions which are only equalled by the Tyneside papers, several of which are on my shelves.

First of all I should like to see your districts somewhat sub-divided—thus No. 10 takes in an area of Old Red, limestone (Aymestry), and Silurian, i.e., Wenlock and other shales. The flora will differ materially in the various parts of this area, and while one side of No. 10 will hardly have a single plant which No. — has not, the other side may vary considerably.

Thus, Verbena officinalis grows near Wigmore, Hyoscyamus nigee ditto; neither one nor the other is on this side Deerfold; and while Chysoplenium

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oppositifolium is generally the more common plant, it is rare here (comparative, i.e.), and C. alternifolium—a plant I never found upon the Yorkshire coal bearing strata—is common.

We have too Primula elatior, as well as some sports of P. Vulgaris; in the London Catalogue P. elatior is entered as found in only two of the 18 provinces.

The famed Asarabaeca is entered as in three districts. Hooker says, "Woods in the north—Lancashire, Westmoreland, and near Halifax. The Halifax habitat is long gone. It has been found near Thorpe Arch in Yorkshire. The specimen in my collection of mummies is from near Halifax.

The Deerfold locality is new, but it is a very doubtful native here. I think I told you I employed a man to bring me a barrow of Daffodil roots from the little meadow where Asarum grows. Among his captives were the single daffodil, a double variety, flowering about a week later, and the common garden Turk's cap lily! now wild enough in the same few yards of ground.

There are many beautiful wild flowers here. When they do grow it is in profusion, but there are no great variety of them. The district is not to be compared with the mountain limestone of North-West Yorkshire, the richest botanical ground I know.

I will give a list of the birds I have observed on a separate sheet. I could, I think, have made it longer, but I cannot find in my heart to kill the little beauties merely to index their names, and so have no doubt passed over many.

The ferns are not remarkable here except for their beauty. I think there are no very rare ones. The mountain limestone districts only are really rich.

Referring again to wild flowers. There are singularly few species of orchis. Morio, mascula, and pyramidalis are the only ones I have seen.

I began to seek mollusks, but found so few varieties, and those of so little interest, that I have neglected them. I have a tolerably large collection made in Yorkshire. Many of the commoner forms are here conspicuous by their absence, though the shell-less wretches abound.

Fungi—what are they? I know nothing of them. There are many kinds—red, green, yellow, blue. They look very uneatable, but I'm intensely ignorant.

One can't do everything, and I am growing idle; but I think an insect collector would meet with his reward here. The Camberwell Beauty was taken last year at Stanage. The wasps and bees are worth looking up. Sirex gigas is found, &c., &c., and I have seen some very fine longicorns.

Yours truly,

CHARLES HENRY MIDDLETON.

P.S.—Pottery on Deerfold I forgot. Must make it the subject of another letter.

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List of Birds observed within two miles of Lingen in the years 1871-2-3.
(Names after Macgillivray).

Falco Tinnunculus—Kestrel.
Accipiter nisus—Sparrow Hawk.
Circus æruginosus—Hen Harrier.
Ulula aluco—Tawny Owl.
Aluco flammens—Barn Owl.
Caprimulgus Europœus—Goat Sucker
Cypselus muarius—Black Swift.
Hirundo rustica—House Swallow.
,, urbica—Martin.
,, riparia—Sand Martin.
Muscicapa grisola—Spotted Fly Catcher.
Alcedo ispida—Kingfisher.
Lamius colluris—Red-backed Shrike.
Garrulus glandarius—Jay.
Pica melanoleuca—Magpie.
Corvus corone—Crow.
,, frugilegus—Rook.
,, monedula—Jackdaw.
Sturmis guttatus—Starling.
Cinclus Europœus—Dipper.
Turdus merula—Blackbird.
,, torquatus—Ring Ouzle.
,, palaris—Fieldfare.
,, viscivorus—Missel Thrush.
,, musicus—Song Thrush.
,, Iliacus—Redwing.
Alauda arvensis—Skylark.
,, arborea—Woodlark.
Anthus pratensis—Pipit.
Motacilla Yarrell—Pied Wagtail.
,, Borul (Swallow).
Accestor modular—Hedge Sparrow.
Erithacus rubecola—Redbreast.
Fruticola rubetra—Whinchat.
Saxicola œnanthe—Stonechat.
Ruticella phœnicurus—Redstart.
Sylvia atricapilla—Blackcap.
,, cinerca—Whitethroat.
Phyllopneuste Trochilus — Willow Wren.
Phyllopneuste hippolais—Chiff-chaff.
Calamoherpe phragmitis—Sedge Reedling.
Sibilatrix locustella — Grasshopper Warbler.
Parus fringillago—Oxeye Tit.
,, cœruleus—Blue Tit.
,, ater—Coal Tit.
Certhia familiarias—Tree Creeper.
Anorthura troglodytes—Wren.
Sitta Europœa—Nuthatch.
Picrus pipia—Spotted Woodpecker.
,, striolatus—smaller ditto.
,, viridis—Green ditto.
Cuculus canorus—Cuckoo.
Emberiza miliaris—Corn Bunting.
,, citrinella—Yellow ditto.
Fringilla cœlebs—Chaffinch.
Passer domesticus—House Sparrow.
Linaria chloris—Green Linnet.
,, cannabina—Brown ditto.
Carduela spinis—Goldfinch.
Pyrrhula pileata—Bullfinch.
Columba palumbus—Ring Dove.
,, œnas—Stock ditto.
,, lustur—Turtle ditto.
Phastanns colchicus—Pheasant.
Perdrix cinerea—Partridge.
Saveleas cristatus—Lapwing.
Tringa—? Sandpiper.
Totanus calidris—Redshank.
Actitis hypoleucus—Weet-weet.
Sc- lopax gallinago—Snipe.
,, gallinula—Jack.
Rusticola sylvestris—Woodcock.
Ardea cincrea—Gray Heron.
Crex pratensis—Corn Crake.
Gallinula chloropus—Waterhen.
Fulvia ater—Bald Coot.
Anas boschas—Wild Duck.
Sybeocyclus Europœus—Dab Chick.

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THE GEOLOGY, HISTORY, AND NATURAL FEATURES OF THE NEIGHBOURHOOD.

By Mr. T. J. SALWEY.

The address delivered by Mr. T. J. Salwey at the Haye Park meeting was as follows :—

Mr. President, Ladies, and Gentlemen,—I esteem it a great honour to to be asked to address you on this occasion, particularly as I am not a member of the Woolhope Club, but as a member of the Ludlow Club I can give you a hearty welcome to our district. I see in the programme for the day that I am put down for an address on the botany, geology, and scenery of the locality. Now, I know nothing of the science of botany, therefore I can tell you nothing of the botany of the neighbourhood. The geology of the district is particularly interesting, but from the point where we are now standing it is impossible to see the best part of it; however, we will treat upon what we can see. Our present situation is high in the Silurian system, this park being the Lower Ludlow and Aymestrey limestone formation. If we look to the south-east we shall look across the Upper Ludlow for about a mile and then get upon a large tract of Old Red which extends to Malvern. On the south-east and past Hereford and Monmouth to Cardiff on the south, and almost to Ironbridge on the Wye, down the valley of the Teme and Lugg, there are numerous alluvial deposits which form rich meadow land, but in many cases are difficult to drain. We are very near the line of a fault about 10 miles in length which extends from the Rownbury in a south-westerly direction. That hill called Tinkershill is on the line of it, and is an isolated bit of Aymestrey limestone and Upper Ludlow. The Clee Hills themselves demand considerable attention, as the cause of their uplifting is an eruption of basalt, a comparatively scarce stone, but which is making the name of Clee-hill celebrated wherever it goes, it being a first-class road making material. This basalt is of a blackish colour, for which reason it is often called Dhu stone. It is extremely hard, but yet brittle, so there is little difficulty in breaking it. It must have come up in a molten state at some period since the deposition of the carboniferous system, through, comparatively speaking, narrow trap dykes, and then flowed over the top like a mushroom. Round the right hand or Cornbrook-hill, some of the coalfield remains and is still worked. The carboniferous limestone shows only on the south side; above this and on the north side comes Millstone Grit, and above this the coal measures, the hill being capped by Dhu stone or basalt.

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The left hand or Titterstone Clee-hill is on the junction of the Millstone Grit and Old Red. To the north-west of Titterstone Clee there are several bands of Cornstone. The two hills farther to the north are similar to the Cornbrook in formation, but with this peculiarity, no trap dyke is known to exist under the southerly one. It is supposed that the basalt cap must be part of the one on the northerly, or Abdon barf, and that the hollow between them has been caused by denudation. The hill on which we stand is one of a series of Upper Silurian hills running down the north-west side of Herefordshire and through Radnorshire. This Silurian formation continues to the north-east as far as the town of Ludlow, from which it takes its name; it then follows Bringewood Chase to the west about five miles, after which it turns north-east again for many miles in a regular series of hills known as Wenlock Edge. This row of hills for the most part dip to the east, where they are bordered by the Old Red. The crests are generally Aymestrey limestone, the face of the hills being lower Ludlow, with Wenlock limestone at the foot, the valleys to the west being Wenlock shale and alluvium. About 15 miles to the north-west we come upon the Lower Silurian and Cambrian formation at Church Stretton. At our backs there is most interesting valley of denudation, with Bringewood Chase on the north and the High Vinnells on the south, both hills being formed in the way I have just mentioned. After passing the valley behind us we get into the heart of the Silurian district. Now I think we will pass to the various points of antiquarian interest. First of all Richard's Castle comes into notice, and to give an account of its rise we must go back to the time of Edward the Confessor. Edward was brought up in the Norman Court, and when he acceded to the throne was accompanied to England by various Norman hangers-on, amongst them being one Raulfe and one Ricardus Fitz Scrob. The Normans were soon in favour, having lucrative and important posts given them all over the country, Raulfe having charge of the county of Hereford, and the posts of defence established against the Welsh. He was assisted by this Ricardus Fitz Scrob, who was the builder of what the peasantry call to this day Rickard's Castle. After a while the overbearing behaviour of the Normans gave such great offence to the English people, particularly to the celebrated Godwin, Earl of Kent, who was the King's father-in-law, and a man of very great importance in the kingdom. Party feeling ran high, and the Normans having the ear of the King managed to obtain the banishment of of Godwin and all his sons, and the confiscation of their property; but their triumph was of short duration, for in the summer of 1052 Godwin came back to Kent, was joined by his sons, and there was a general rising of the people in his favour. A sudden fear siezed the Normans, and upon the first sign of a concession by Edward to Godwin, they fled from England as fast as they were able. A Council of State was held at which Godwin appeared, spoke in his own defence, justified himself from every accusation before the King and the people, and William of Malmesbury says that his sons justified themselves in the same manner; their sentence of exile was reversed, and another sentence unani-

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mously passed which banished all the Normans from England as enemies to the public peace, favourers of discord, and calumniators of the English to their King; but there were a few who were allowed to remain and retain their employments, amongst them being Raulfe, Ricardus Fitz Scrob, and his father-in-law, Robert the Dragon. How they repaid this hospitality will be seen. After a while Godwin died, which was a great loss to the English people, as the policy which he advocated opposed the interest of the Normans in this country. His advice was not followed, and the result was the Norman conquest. In 1054 another great loss befel the English in the death of the veteran Siward. Thierry says that Harold now stood first among the brave and powerful men of England. He appears to have been active in body and mind, and to have compelled the Welsh, who, encouraged by the bad defence of the Frenchmen Raulfe and Ricardus Fitz Scrob and their foreign soldiers cantoned in this district, made about this time several irruptions into England, to retire within their ancient limits. Now during the time between 1052 and 1066, when this invasion took place, this Richard Fitz Scrob was engaged in intrigues with the banished Normans for their return and reinstatement. He with his French soldiers fortified himself in this amongst other Herefordshire castles, and made frequent sallies upon the neighbouring towns and villages, endeavouring to force them to submit to William, but he was driven out of this district within three months of William's departure from Normandy by a body of Saxons and Welsh, under the command of Edric, the son of Alfric. But it was of little avail; the Normans returned with overpowering force, and the erection of Ludlow Castle about the year 1070 brought this country to rest, except from the Welsh. I know but little more of the Castle and its fortunes until the time of the Parliamentary wars, when it was the property of Major Richard Salwey, a man of considerable ability as a soldier and politician, and of some influence in the State. (The lecturer here handed in a letter from Oliver Cromwell). The Royalists got into the Castle and he'd it at one time, but were forcibly dispossessed by the Parliamentarians, who took it by surprise and dismantled it. Richard's Castle Church is remarkable as being one of the instances in which the tower is separated from the body of the church. Some portion of the church appears to be of the fourteenth century, as is shown by the existence of the ball flower in one of the windows. In ancient times a fair was held at Richard's Castle, but it has now become obsolete. I have heard some of the older peasantry speak of a house in the village, known as the toll-house, through which a footpath ran. A few moments since we were speaking of Oliver Cromwell, and it is but one mental step to bring us to his secretary, John Milton. In Milton we are this day specially interested, as we are on the scene of his great Masque of Comus. I need hardly tell you that the Masque took its rise from circumstances that took place in these woods, then much more extensive. About the year 1634, Lord John Brackly, his brother, and his sister, the children of John, Earl of Bridgewater, then the President of the Marches, were travelling to Ludlow Castle, where the Court of the

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Marches was held, and were benighted in this forest. Henry Lawes, the Court musician, thinking what an admirable masque their adventures would make, prevailed on his friend John Milton to write the verse while he (Lawes) wrote the music. On Michaelmas night, 1634, this masque, embracing in the cast many of the actual characters, was presented to the world in the banqueting hall of Ludlow Castle. If any of you should like to come with me through the woods, you need not fear similar adventures, as, like Comus,

> I know each lane, and every alley green,
> Dingle or bushy dell of this wild wood,
> And every bosky bourn from side to side,
> My daily walks and ancient neighbourhood.

While the mental food was being discussed, Mr. Broadwood's servants were preparing the tent for the bodily refreshment of the club, and had the addresses been of the driest (which they were not) the cooling drinks which Mr. Broadwood's hospitality caused to be circulated would have done much to facilitate their acceptance. At the pic-nic lunch it was hard to say what were the products of individual baskets, and what the contributions of the kindly host of the day. Vegetables, fruit, ice, seltzer water, lemonade, gingerade, sherry, brandy, and divers others adjuncts to a repast were certainly provided by the latter, as well as the whole apparatus of knives, forks, plates and dishes, and glass, those necessaries which it is so difficult to carry in baskets, and which, when carried, usually fall so short, and have so often to serve a double and a treble purpose. It is only due to Mr. Broadwood to say that he had offered to undertake the whole entertainment of the club, but the President, feeling that the numbers might be unusually large, owing to the attractions of the district and the circumstances of the meeting, had recommended the modified, but still very handsome and helpful form, which his hospitality took.

After lunch a vote of thanks was proposed by the President to Mr. Broadwood, and seconded by Mr. Swinburne, which Mr. Broadwood briefly acknowledged. Whilst the able-footed pedestrians proceeded after lunch to the High Vinnals, now like the Haye Park Woods enclosed and planted by their owner, Mr. Andrew Boughton Knight (whose permission to traverse his territory in any parts of it was duly acknowledged by the President at the close of the lunch), the ladies adjourned to the Haye Park House and adjacent grounds, and the committee of the club proceeded to transact the current business of the day.

A letter was read from the Rev. R. H. Williams, suggesting that prizes should be offered by the Club for a collection of dried plants, and another for a collection of insects, made in the course of each year, in any one parish of those connected with the Club, such collections to be sent in to the secretary before the 15th of December.

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The subject of Mr. Williams's letter was discussed, and it was eventually decided to adopt his suggestion, but—as the time between the August meeting and the end of the year would be somewhat short—to begin the prize-system with next year, and not the present, each prize to be not less than one guinea.

The President announced that the editorial committee was ready to arrange for incorporating the papers and addresses of the year 1872 in the volume to be published by them for the year 1873. He also announced the promise of papers for the Club's transactions from Dr. McCullough and Dr. Chapman, and others.

The details of the Brecon meeting, on the 26th of August, were afterwards discussed, and it was arranged that Mr. John Lloyd, Mr. West, and one or two others acquainted with the district should be requested to consider the best programme to adopt. Hopes were entertained of the feasibility of an excursion to the Brecon Beacon. By the time the explorers of the High Vinnals had returned the ladies had enjoyed a delicious "afternoon tea," provided for them by Mr. Broadwood, in the Haye Park House. A very fine sycamore, a variety of the Acer pseudoplatanus, with abundant double samaras of a rich reddish-brown, contrasting beautifully with the deep green foliage, had been inspected, and the secretary's whistle or bugle-note had announced that the carriages were ready for the return to Ludlow. Before responding to the announcement we satisfied ourselves that the tree measured 15 feet 4 inches in girth at 5 feet from the ground, and that its shade reached some 30 feet in diameter. The precise variety (for that a variety it was, is evident from the colour of the samaras), we had not the means of ascertaining.

A beautiful drive, at first through acres of woodland richly dight with luxuriant foxglove, then by a sharpish incline of private road through the park, brought the carriages out into the highroad near the Lodge, and thence it was an easy and quickly performed passage to Ludlow. A section of the members walked thither from the Haye Park by way of Mary-Knoll, and a large proportion visited the castle and the church, whose features are too well known to need any record or commemoration here. Not a few members availed themselves of the kind hospitality of their Ludlow friends and allies, and at 6.28, on the platform of the station, when the Shrewsbury train for Hereford arrived, a very pleasant party had to break up into carriages and compartments, and to hope that there next meeting might be half as pleasant, successful, and unalloyed by drawbacks or contretemps.

Amongst those present at the meeting were the President, Mr. J. H. Davies, Mr. H. P. Davies, Miss Mary and Miss Alice Davies, Mrs. Phillips (Ludlow), the Rev. H. Cooper Key, Mrs. Key and party, Rev. S. Clark, Mr. W. Clark, W. Swinburne, Esq., V.P., and Mrs. Swinburne, Rev. G. H. Clay, Mr. George Cocking, Mr. Edward H. Greenly, Mr. F. W. Herbert, Mr. Richard Hereford, Rev. H. C. Key, Mr. James W. Lloyd, Mr. John Lloyd, Rev. H. B. D. Marshall, Mr. J. E. Norris, Mr. J. Clifton Paris, Rev. Thomas Phillipps, Mr. Alfred Purchas, Mr. Humphrey Salwey, Rev. Eric J. S. Rudd, Lieut.-

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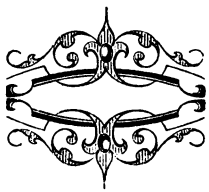
Colonel Symonds, Rev. F. S. Stooke, Rev. Stephen Thackwell, Mr. W. H. West, Mr. Alexander Waters, Mr. G. Phillott and Friend, Mr. Thos. Weyman, Mr. Arthur Thompson, Treasurer. Lady Visitors: Mrs. Swinburne, Mrs. G. B. Price, Miss Bowen, Miss Hereford. Miss — Hereford, Mrs. Phillipps and Miss Phillipps (Dewsall), Mrs. E. Grassett, Mrs. Purchas, Mrs. A. Purchas, Miss Purchas, Miss Marshall, Miss Matthews, Miss Haggard, Mrs. Key, Miss Heale, Miss M. Heale, Miss Greenly, Miss Thomas, Miss Eckley, Mrs. Lloyd, Mrs. Salwey, Miss Salwey, Miss L. Salwey, Miss Hodgson; Mr. W. H. Broadwood, Mr. Theos. J. Salwey, Mr. John Salwey, Mr. Phillips, Mr. J. H. W. Clark, Mr. C. Donald, Mr. Haggard, Mr. Frank Jones, and Mr. E. Grassett,



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The Woolhope Naturalists' Field Club.

MEETING AT BRECON,

TUESDAY, AUGUST 26, 1873.

The Woolhope Club held its last field meeting (if such it may be termed) at Brecon, on Tuesday, August 26th. The day was showery, and this unfavourable state of weather co-operated with certain local circumstances to render the assemblage of members rather smaller than usual. Amongst those present were the Rev. Sir G. H. Cornewall, Bart., Sir Christopher Lighton, Bart., Mr. James Rankin (High Sheriff), Rev. James Davies (president), Rev. B. S. Stanhope, Dr. Chapman, Mr. A. Armitage, Rev. C. J. Robinson, Rev. C. J. Westropp, Rev. A. G. Jones, Rev. R. H. Williams, Rev. W. Stanhope, Rev. S. J. Machen, Mr. Robert Lighton, Dr. Griffiths Morris, Mr. T. Curley, C.E., Mr. J. T. Owen Fowler, Mr. James Henry Davies (Moor Court), Mr. Isaac Davies, &c., &c. The members on their arrival at the Castle Hotel, were conducted by Mr. David Thomas, of Brecon, to the summit of the Crûg, from whence he pointed out to them the numerous mountains, hills, and other prominent features by which the landscape is diversified. The old Roman station of Gaer Bannium, some three miles off, was observed, and due attention paid to the earthworks by which the British Camp on the Crûg is surrounded. In descending the hill a visit was paid to the Maindee or Wishing Well, which furnished through leaden pipes, the Priory of Brecon with an abundant supply of water, and now produces a large leafed lichen of some rarity.

At the Priory Church the club was met by the Rev. Herbert Williams, vicar of St. John's and St. Mary's, Brecon, who explained in detail the restorations that are being carried on under the direction of Sir Gilbert Scott, and drew attention to the Early English windows of the choir, the recently-discovered coffin-lids, the richly-carved screen, and the extraordinary number of monumental remains which are among the chief objects of interest in the ancient church. The heavy rain curtailed the programme, and the Club, reluctantly abandoning all hope of visiting the College, returned to the Castle Hotel where dinner was served at 3.30 p.m.

After dinner the thanks of the Club were voted to Mr. Thomas for having acted as guide during the morning's excursion, and for acceding to the

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proposition that he should write a paper on the locality for the Club's transactions, and to the Rev. Herbert Williams for conducting the members over Priory church.

The President then called upon T. A. Chapman, Esq., M.D., to read a monograph on the "Dung Beetle, and its parasites," and afterwards upon the Rev. C. J. Robinson to read his paper on "The Domesday Survey of Herefordshire."

The President announced that the Woolhope Fungus Feast would take place on Thursday, October 23, and requested members to send their collections of fungi to the committee at Hereford, on the 22nd, in order that they may be duly labelled and classified. Mr. Berkeley, Mr. Broome, and other eminent mycologists have signified their intention of taking part in the preliminary "Foray," the scene of which will be pubilshed as soon as possible.

Mr. Curley proposed and Mr. Griffiths Morris seconded the nomination of Mr. H. Carless, of Hereford, as a member.

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ON GEOTRUPES STERCORARIUS AND ONE OF ITS PARASITES.

By T. A. CHAPMAN, M.D.

You are all doubtless well acquainted with the largest subject of the observations I propose to lay before you, viz., the "the shard-born beetle with its drowsy hum" of the poet—the Geotrupes stercorarius. Some five years ago I was struck by the fact that, notwithstanding that this is one of our commonest and largest native beetles, I could find no satisfactory account of its life history in any work accessible to me, and those remarks that did appear were very vague, and where definite were, as I afterwards found, frequently inaccurate. I determined, therefore, to observe the creature for myself, and was rewarded in doing so by finding that another beetle of the same lamellicorne family was attached to it as a cuckoo parasite; this fact is very remarkable, as all the beetles of this family are not only vegetable feeders, but are all supposed to be of most pacific and unaggressive habits. This other beetle is the Aphodius porcus.

The principal facts of the history are to be observed in September and October, and, indeed, throughout the winter. In these months almost any horse or cow dropping may be observed to have one or several small heaps of mould beside it; these are the result of the excavations beneath by Geotrupes stercorarius, and by raising a considerable piece of turf with care all the facts I am about to relate may be observed.

Single specimens of Geotrupes stercorarius may be found in short burrows under horse or cow droppings, but when the business of oviposition is commenced a pair of beetles are always associated. The burrow, formed with this object, extends nearly vertically downwards to a depth of six to eight, or even twelve inches, and as many as five or six pairs of beetles are sometimes at work under one dropping. This vertical burrow is almost always made without any excavation, simply by the thrusting of the earth to one side as the beetle forces its way down. It often happens that when the mouth of this burrow is beneath the centre of the dropping, this opening is kept free for the supply of pabulum, and a subsidiary canal is carried thence along the surface of the ground to the edge of the dropping by means of which the earth removed from the deeper workings is ejected. The cavities wherein the eggs are laid branch horizontally from the bottom of the perpendicular burrow in various directions and at slightly varying heights, to the number of 6 or 8. They appear to be made successively one at a time, the lower being made last. Each branch is about

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an inch wide and four or five inches long. The earth is removed from these and forms the little heaps on the surface already alluded to. Each of these horizontal tunnels contains one egg and a store of pubulum. The rounded further end is firmly and tightly packed with concentric layers of the material brought down, and in the centre of these layers is a beautifully constructed cavity containing the egg. This cavity is about half an inch deep by $\frac{3}{8}$ths high; it is oven shaped, having a slightly hollow floor and a highly arched roof, the front or last finished side being nearly perpendicular. This cavity is carefully lined with, perhaps I ought to say formed of, a thin layer of earth worked to a clay-like consistence, nicely smoothed and finished, and often marked by the front tibial of the beetles, as if they had used them as trowels. The total capacity of the cavity would be sufficient to hold half a dozen eggs, one only, however lies loose on the floor; it is beautifully clean and white, quite unsoiled by the clay surrounding it, nor is a loose particle of any kind often to be found in the cavity. How the beetles manage to close it without allowing earth to fall in it is difficult to imagine, and I do not know how the process could be observed. The material immediately following is placed rather loosely, but the rest of the tunnel is tightly crammed, layer upon layer, similarly to the first portions. The last half or three-quarters of an inch next the perpendicular burrow is closed in with earth—no doubt a portion of that removed from a new tunnel begun on the completion of the first.

The egg is 3-6ths of an inch in length, rather thicker (1-10th of an inch) at one end than the other, and slightly contracted in the middle; it is of a pale, straw colour, very delicate and easily broken. Before the young larva is hatched the egg increases slightly in length and becomes of nearly double the previous diameter—viz., $\frac{1}{8}$th. This appears to arise from imbibition of fluid and possibly also of air. The young larva devours the stored pabulum, passing along the centre of the tunnel to the opposite end, and then returns. I believe it makes two such complete journeys before it is full, which it is in the following July, when it constructs a cocoon or cavity of firmly pressed earth at the same end of the tunnel as the egg originally occupied. Here it assumes the proper state and becomes perfect in the following August or September.

These arrangements so carefully made by Geotrupes stercorarius are turned to account by Aphodius porcus. At or about the time Geotrupes stercorarius is constructing the egg cavity, the female of Aphodius porcus arrives and makes her way into it. Here she lays her own eggs—these are spherical, of rather less than 1·20 in diameter. She arranges them in the surrounding material each in a separate little spherical cavity as carefully constructed as that of Geotrupes stercorarius, and in affording these little spaces, the larger space of Stercorarius' egg cavity is used up; but, at the same time, the egg of Stercorarius disappears, and then the Aphodius porcus succeeds in quitting the tunnel. I do not know how long this process takes, but I believe about a week. I have counted as many as ten eggs of Porcus so arranged, and I believe I have seen more when I had not counted them.

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Now, what becomes of Geotrupes stercorarius' egg? I have observed its disappearance in all stages. First, it becomes flaccid, and finally disappears. I have several times seen Porcus' nose applied to it, as if discussing its contents, and if it were merely injured, and the contents allowed to soak away, I believe it would not so completely disappear, and that the moisture of its soaking away would be noticeable. My observations make me without hesitation declare that the egg of the Geotrupes, a mass as large as herself, is eaten by Aphodius porcus. I have, on the following summer, found the Porcus raised from the eggs disposed as I have described. In August the perfect beetles may be found in smooth, earthen cavities, having newly assumed the perfect state. The great mass of the material stored by Stercorarius is then in a pulverulent condition, and seems to have been beyond the requirements of the smaller insects, and has simply decayed.

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THE DOMESDAY SURVEY OF HEREFORDSHIRE.

By the Rev. C. J. ROBINSON.

The favour with which Lord Derby's proposal for a new Domesday Book was received by the Houses of Parliament and the nation at large may perhaps be accepted as sufficient evidence of the general interest that is felt in such undertakings. In its object as well as in the circumstances under which it is being executed the new survey forms a curious contrast to that great inquisition which was held throughout England nearly eight centuries ago. The present survey goes on about us without our cognisance. The rate books and the Board of Trade returns with the official papers of the Excise and other Government Departments supply all the requisite information, and I do not suppose that any whom I have the honour of addressing to-day have consciously contributed a single item to the statistics that are in course of preparation. Under William the Conqueror matters were managed differently—how differently may be estimated by the following extract from the *Saxon Chronicle* relating to the year 1085:—*

"At mid-winter the king was at Gloucester with his 'witan' and there held his court five days; and afterwards the archbishop and clergy had a synod three days. . . . . After this the king held a great council, and very deep speech with his 'witan' about this land, how it was peopled or by what men; then sent to his men over all England into every shire and caused to be ascertained how many hundred hides were in the shire, or what land the king himself had, and cattle within the land, and what dues he ought to have in twelve months from the shire. Also he caused to be written how much land his archbishops had, and his suffragan bishops, and his abbots, and his earls; and though I narrate somewhat prolixly what or how much each man had who was a holder of land in England, in land or in cattle, and how much money it might be worth. So very narrowly he caused it to be traced out, that there was not one single hide nor one yard of land, nor even—it is shame to tell this, it seemed to him no shame to do—an ox, nor a cow, nor a swine was left that was not set down in his writ. And all the writings were brought to him afterwards." It is thought that these returns were afterwards corrected and condensed by the clerks in the exchequer, who omitted the tables of live stock, which occur only in the book called Little Domesday—a record relating exclusively to East Anglia. The object of the Commision was not merely to ascertain for the king the value of his newly acquired possession and to furnish him with data for fiscal purposes; it had also especial reference to the supply of

* Anglo Saxon Chronicle. Translated by Benj. Thorpe; 1 vol. ii. 186.

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soldiers and sailors for the defence of the country, each hide of land being under ordinary circumstances liable for its quota. For ourselves the survey has an interest on several accounts. It furnished us with much statistical information of the highest value; it enables us to trace the progress of each county in wealth, population, and I might also say, civilization; it provides the historian, the antiquary, and the philologist with materials for their respective studies, and even the "general reader," whose taste is supposed to be as undiscriminating as his appetite is insatiate, has been known to express his approval of its contents. We must however add that the record is not an easy one to handle. It is written in mediæval Latin, and abounds in contractions and obscure words. Even the names of places—valuable as their early forms are to the etymologist—are extremely puzzling and require for their identification minute local knowledge as well as some acquaintance with the languages of the successive invaders of our country.† The Woolhope Club, which draws its members from every district in Herefordshire, seems especially fitted to to take in hand the careful examination of that part of the survey, which relates to this county, and if my paper to day, which must be regarded as a very brief one in indication of the contents of this record, stimulates others to its fuller investigation, some practical purpose which have been accomplished by it. Herefordshire at the time of the Domesday Survey comprehended within its limits certain tracts of land which are now attached to Worcestershire, Gloucestershire, and Radnor;‡ and on the other hand did not include the the district of Leintwardine, which was separated from Shropshire as late as the 14th century. Our county was divided into 22 hundreds,‖ the exact boundaries of which are extremely difficult to ascertain as they were liable to constant fluctuation and often have no correspondence whatever with the modern divisions. The Hundred took its name from the mote or meeting-place where twelve times in the year a court was held—the spot chosen for the assembly being often (as in the case with the Woolhope Club) the shelter of some conspicuous tree or a familiar hill-side. Thus there were in Herefordshire the Hundreds of Grey trees (possibly great trees); Dodintree, the tree of Dodda, Earl of Mercia; Hezetree, the hazel tree and Cuthorne—perhaps Crat's thorn. And again Wormelow, the mound of the river Worm; Radlow, the Red-hill; Thornelow, the Thorny-hill: and Elsedune, Ella's-hill. A few of these names still survive, and it has been thought that Wormelow—the mote of the largest division—was employed not merely as a court of justice, but also for the warlike muster of the Thanes and their armed retainers. The hundreds were subdivided into manors and these again into demesne lands (which were held by the lord himself in severalty and distinct from the tenants) and bondlands,

† This difficulty is increased by the obvious fact that the scribe—probably a Norman—wrote the names as they sounded to his foreign ear and without any fixed law of spelling.

‡ *e.g.*, Ruuirdin (Ruardean); Hanlei (Hanley); Discote (Discoed).

‖ Further investigation may probably reduce this number, as the names of several of these hundreds very closely resemble each other.

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which were divided into small tenements of nearly equal value and possessed of equal rights of commonage. In Herefordshire, the proprietors of the land, as we should now call them, were but 35 in number at the time of the Domesday Survey. Foremost among these was the king himself, for although strictly speaking all lands were held direct from him by their feudal lords yet only those were entered in the King's name which had not been formally granted by him to others. Together with less important places he held Leominster, Marcle, Marden, Lugwardine, and Kingston, and received in rent from the city of Hereford 60lbs. weight of bright and new pennies. Next in order came the Bishop of Hereford, and it is worthy of remark that with the exception of some few changes made in the reign of Elizabeth, the present possessions of the see differ but slightly from those which were attached to it in the Conqueror's time. The alien priories of Cormeillies and Lyre, enriched by the munificence of William Fitzosborne, Earl of Hereford, were proprietors to a considerable extent; as also was the Priory of S. Guthlac, which Walter de Lacy founded, within the city of Hereford. Next in order, inasmuch as he was a priest, follows the name of Nigel, the physician, a well-paid functionary if we were to estimate the thousand acres which he held at their present value. The chief barons who had grants in Herefordshire were Ralph de Todeni, the Conqueror's standard-bearer at the battle of Hastings; Ralph de Mortimer, whose name needs no comment; Roger de Laci, who has left the impress of ownership upon a dozen places in the county; Robert Gernon, progenitor of the old county family; Garnons of Garnons; Alured, of Marlborough, who had been a Thane under the Confessor; and Osbern Fitz Richard, son of that powerful baron who erected Richard's Castle, the last trysting place of the Woolhope Club. Two lesser proprietors must be noticed—Hugo Lâsne, *i.e*, Hugh, the ass, whose success in his lifetime seems to belie his nickname; and the nameless wife of Ralph, the chaplain. Who this lady was we know not, but the very mention of her status serves to remind us that celibacy among the clergy was not the rule in the 11th century.

Passing now from the lords to their tenants we must bear in mind that the latter were divided into several distinct classes of freemen and bondsmen. To begin with the free tenants of the first degree, we find in Herefordshire and in other counties bordering on Wales, certain persons called Radknights, or Radmen, who appeared to have enjoyed their freeholds by the performance of some slight farm service for the lord—rendering him help at seed and harvest time—and following him to battle on horseback. The usual tenement of a Radknight was about 100 acres, and occasionally he was lord of a manor and held immediately from the crown. Almost on a par with the Radnights were the Sochemen, who held their lands from the chief lord by certain defined services. There was nothing to prevent them from being themselves lords of manors; nothing (in most cases) to prevent them from selling their estates or from changing their lords—*poter at ire quo voluit* is the common phrase used in Domesday to express their freedom on the part of a Socheman.

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The tenants of bond lands were generally villiens and bordars. Villiens—in spite of their ill-sounding name—corresponded in the main with our own tenant farmers, though they held their farms on what would now be thought harsh terms. They occupied their own part of the manor as distinct from the lord's demesne. Each had his yardland, amounting to about 30 acres of the common fields, and was employed also upon any agricultural work which his lord might set him. As the old saying went, they knew not in the evening what would be the labours of the morning. The classes below them were the bordars and cottars, who occupied smaller holdings, assisted the villiens in husbandry and were not often possessors of ploughs and oxen. Lowest of all in the scale came the slaves, male and female—*servi et ancillæ*—about whose condition we will only say that—*pace* Mr. Arch—it differed very greatly from that of the agricultural labourers of the 19th century. But besides these distinct classes we meet occasionally in Domesday with other persons who were engaged in rural occupations but were not necessarily occupiers of land. Thus we have *bovarii* or neat herd. These were often free men and had charge of the cattle which then, as now, were among the chief products of Herefordshire. I scarcely know whether we should be justified in estimating the condition of a manor (from a farmer's point of view) from the number of bovarii employed on it; but if it *be* a fair criterion, then we must conclude that Pembridge, which now, I believe, is the chief prize-taking parish at the agricultural shows, was inferior to the little parish of Sarnesfield. In the latter three neat-herds found occupation, in the former none, the reason probably being that, as Domesday mentions, the woodland in Pembridge was very extensive, and gave sustenance to 160 pigs. Swineherds *(porcarii)* were rather important people in those days. They ranked not as servants of the lord but as villiens or members of the farming class, and paid 10 pigs per cent. for privilege of feeding their charge in the lord's wood. This payment was called pannage, and was sometimes made the subject of a free grant. Often, however, the lord reserved his wood for purposes of chase, surrounding it with *a hay*—hedge or fence—a term which survives not only in the town of Hay, but also in the sense we have first used it—in the two Haywood Forests, which are familiar to Woolhopians. Trevil Forest (of which Haywood, near Hereford, was an enclosed portion) is mentioned in Domesday under the head of Kingston, in the following terms:—

"There is a wood there called Treveline, which renders no customary due besides the chase. The villiens being there in the time of Edward the Confessor used to carry the venison to Hereford, and performed no other service."

Perhaps I may here be allowed to direct special attention to one of these Haies or game coverts which I have failed to identify. The entry runs thus when translated:—

"The same Hugh (*i.e.*, Hugh the ass) holds *Bernoldune*: Turchil held it. There are two hides of land. The forest there is large, but how large is not recorded. There also is a hay, in which he takes all he can catch. The rest of the land is waste."

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The position of this game enclosure is Hezetree Hundred, which, so far as I can determine, included most of the parishes lying on the north-western edge of the county, and extended southwards at least as far as Eardisland parish. Possibly it may be Burrington, on the edge of Mocktree (Mudtree) Forest, or is it *Bernoldune*, may be identical with *Burlton*, a hamlet of Burghill? The latter is rendered probable by the fact that Hugo held lands in adjoining parishes of Credenhill and Stretton.

Two other officers must be mentioned before we quit the subject. The bailiff (prepositus), and the harvest-inspector (bedellus) were very important functionaries. The former (if prepositus villæ) superintended the work of all the villiens on the manor, and no doubt corresponded with the reeve—the "slender colerike man"—whose portrait is drawn by Chaucer in his picture of the Canterbury pilgrims. The bedel—one was settled at Pion, and several at Leominster or elsewhere—either looked after the crops or else acted as a sort of bailiff or reeve.

With regards to to the products of Herefordshire in Domesday times we canuot say much. It was then, as now, an agricultural county, and one may add a game-preserving county. Indeed we find that the only rent paid by some tenants in the Golden Valley, *Becce in Valle Stradelm*, in those days was a hawk and a couple of hounds (p. xvii), and a large extent of the county was waste land wherein the lords could do little else than follow the chase. Yet the rivers were even then not unproductive. Payments in fish are often mentioned, and fisheries *(piscaria)* were evidently highly valued; but so far as I have yet seen there is only one distinct reference to salmon, and that is under the head of M. Marcle, where one hide of land (I suppose abutting on the river) paid a rent of six salmon. The rent of most of the fisheries and of some of the mills seems usually to have been returned in eels. Thus the fishery at Sarnesfield (which it would be difficult to find nowadays) paid a rent of 600 eels. Honey, again, was a product of considerable value, and the bee-keeper *(melitarii)* are often specially mentioned. No doubt it supplied in some measure the lack of cane-grown sugar, which, as Mr. Lowe reminds us in his Budget, enters so largely into most of our food manufacture. Still more important was the supply of salt, which was provided for in a somewhat curious way. Attached to several places in the county, *e.g.*, Tupsley, Ledbury, Ullingswick, and Morton. was an interest in the salt works or salt pits of the Cheshire or Worcestershire districts. These districts went by the generic term of "wick," and the phrase in Domesday which expressed the connection to which I referred was "salina," or "pars salinæ" in "wick." Those members of our club who are acquainted with the eastern side of Herefordshire are aware that traces of smelted iron are to be found at long distances from the nearest known ironworks. It has, I think, generally been thought that the Romans were the first to develope to any great extent the workings in the Forest of Dean, and that they sometimes transported the ore to other places for the purpose of being smelted. Why they should have done so when an

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abundance of fuel was close at hand I do not understand, but certain it is that ronworks existed in Herefordshire not only in their time but also in that of the Domesday Survey. Thus we find that *Alwintune* (Alton, near Ross) rendered *viginti blomas ferri*, and Marcle *quinquinti massas ferri*. Whether blomas and massas are equivalent terms, and what amount they may signify I know not, but the former word seems to be only a Latinized form of the old English Bloma—a piece of smelted iron, and I think that in the Forest of Dean the old ironworks are still called *bloomeries*.

I had intended to have added some remarks upon the Castles, Parks, and Churches, of Domesday Herefordshire, and perhaps also to have strayed into that very debateable land—the region of etymology, but I feel that on this occasion I have trespassed sufficiently upon your attention, and that I run the risk of impairing by my tediousness any interest in the subject which my hearers may at the outset have entertained.

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The Woolhope Naturalists' Field Club.

THE FUNGUS FORAY AND FEAST OF THE WOOLHOPE CLUB.

October 21-4, 1873.

An unusual amount of interest attached to the last meeting of the Woolhope Club for the year 1873, on account of the number and eminence of the guests, learned in mycology, who were invited to take part in the proceedings. Immediately upon the pleasant fact being ascertained that the veterans Berkeley and Broome with some half-dozen other foremost mycologists would honour the Woolhopians with their presence, it was agreed to map out a programme supplimenting that of the actual club day, October 23rd, and to arrange excursions for Tuesday, the 21st, Wednesday, the 22nd, and Friday, the 24th, to other fungus fields in the neighbourhood of head quarters. By this plan a wider range of country was embraced by the scientific few who accompanied the President and Dr. Bull to Mynde and Bryngwyn, Dinedor, Moccas, &c., on the bye-days; whilst the great day of the club, the Thursday, was more especially notable for the interesting excursion to Holm Lacy park and gardens, and for the success of the annual dinner at the Green Dragon, in point of numbers, entertainment mental and bodily, and the display of fungi, esculent and otherwise, upon the sideboard. But it behoves us to give, as far as space will allow, a faint *resumè* of the week's proceedings; and therefore our readers must suppose a party of ten or twelve, among whom were Mr. C. E. Broome, F.L.S., the Rev. W. Houghton, F.L.S., Mr. James Renny, Mr. Worthington Smith, F.L.S., Mr. J. Griffith Morris, Mr. H. C. Moore, Mr. W. Phillips, with Dr. Bull and the Rev. James Davies (President), to start from the Green Dragon in a break, at the hour of 10 a.m., on Tuesday, the 21st, and proceed, after a little *detour* towards Belmont, to the Haywood Forest, from which, after due search and divers finds, they drove on to Mynde Park, walking thence, after hospitable refreshment, to the grounds and mansion of Bryngwyn, where the High Sheriff entertained the band of foragers to a lunch-dinner at dusk. Of the rarer fungi found in this day's excursion the following may be mentioned. In the fir plantation near the Pro-Cathedral at Belmont, where the first halt was made, Agaricus

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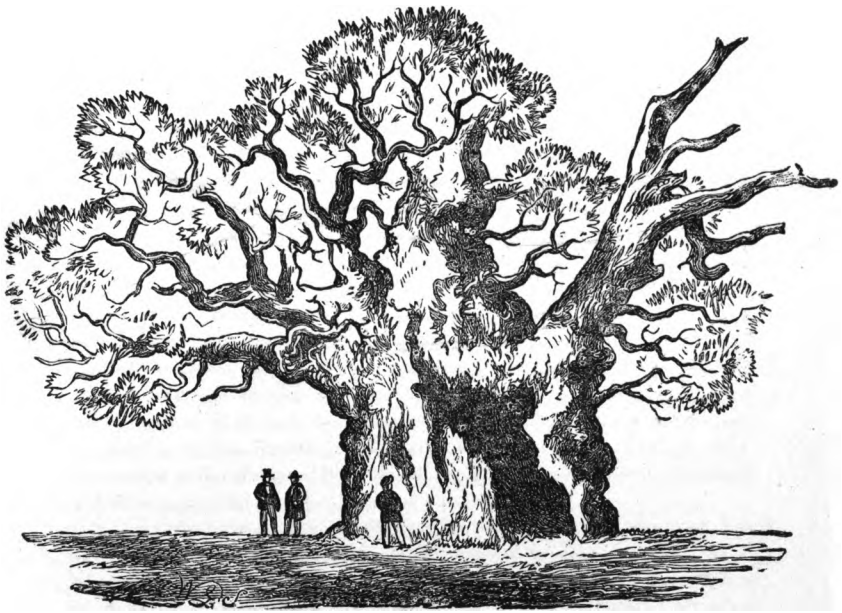
THE REMARKABLE TREES

OF

HEREFORDSHIRE.



THE MOCCAS OAK, 1870.

(Q. Pedunculata.)

This grand old tree has often been figured, and its fame is widely known. It stands in the park of Moccas Court, the seat of the Rev. Sir George Cornewall, Bart. At 5 feet from the ground it gives in fair measurement a circumference of 36 feet. The bole is quite hollow, with an opening on the south side. It has, however, much living spray remaining, and, from the sound state of the northern side of the tree, is likely to continue to bear it for many a year to come. *(See Transactions, for* 1870, *p.* 315.*)*

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cirrhatus, a rare and elegant little fungus, growing from a sclerotium, was at once pointed out by Dr. Bull; then an abundance of the interesting Hydnum auriscalpium, growing from moss-covered fir cones; and the Phisbia merismoides, and other commoner plants. On Merryhill Common, where the carriage was again left, Marasmius caulicinalis was found growing on the fir cones, as indeed it was subsequently in Mynde Park. It is a very rare and local plant, and many specimens were gathered. Here, too, was Hyphomyces lateritius growing on Lactarius deliciosus, a "find" so exciting that, in north-country fashion, it was forthwith solemnised by a hearty shake of the hands. At Haywood Forest Coprinus Lagopus was found, and in the next field to it Mr. Moore gathered Lactarius uvidus, of which the white milky juice turned quickly on bruising to a delicate lilac. A special "hark back" was made to hunt for more specimens, and rewarded at the time by a single find. Later in the day, however, it was gathered again under an oak tree on Bryngwyn Hill. Here also Mr. Plowright gathered Merulius Tremulens, and Agaricus sinuatus was met with, amongst other discoveries. A shower of rain at this point of time, if it did not damp the ardour of the party, at least counselled a return to the carriage, especially as it was near one o'clock, and a friendly shelter was in store at Mynde Park, where they were hospitably and kindly received and refreshed by the owner, Mr. Hudson Lutwyche. Before two o'clock the rain had ceased, and the hunt was resumed in the park. Here, an abundance of the warm richly-tinted Hygrophorus puniceus was found, studding the turf in shades varying from apricot to blood-red, and along the slopes of the Mynde and of Bryngwyn Hill were gathered Lactarius glycyosmus, and L. pallidus by Mr. Broome; Sphinctrina turbinata by Mr. Phillips; Hydnum udum and Polyporus Schweinitsii by Messrs. Renny and Plowright, as well as many others.

Along the brow of the hill it may be stated that the poisonous Lactarius torminosus and L. turpis were particularly plentiful, the one as inviting perhaps by its colour as the other was forbidding by its hues of dirty dusky brown. The lovely Agaricus muscarius was also particularly abundant beneath the birch trees. But the shades of evening began at length to interfere with the ardent quest of these gems of lawn and hill-side, and prepared the excursionists to turn aside to Bryngwyn, where the High Sheriff, a former president of the Woolhope Club, and one of its ablest as well as most liberal members, received them and sustained their inner man with his wonted hospitality, so as to send back the devoted band to Hereford all the more satisfied with their day because of its goodly end. A very interesting microscopic *soirée* was given in the evening by Mr. J. Griffith Morris.

Wednesday morning was devoted to a close examination of the funguses collected for the exhibition and to their arrangement on the tables of the Club-room; but in the afternoon, by the kind permission of F. R. Wegg-

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Prosser, Esq., a foray was made in the beautiful 'grounds of Belmont, where Licea applanata, Peziza succosa, Hydrum alutaceum, Geoglossum viscosum, and Typhula erythropus, met the quick eyes in search of them, though the chief prize of this foray ("give us your hand old fellow") was made by Mr. Plowright; to wit, the rare and local Marasmius Hudsoni, growing on fallen holly leaves. It is an elegant little agaric studded all over with delicate purple spines. On their return to Hereford the guests of the Club were hospitably entertained by Dr. Bull.

On Thursday—the general field-day of the Club—though the weather was unpromising, a fair number of town and country Woolhopians gathered to Barr's Court Station at 9.45 a.m., and took train with the President and the guests of the Club for Holm Lacy Station. The railway authorities had made the excursion cheap and convenient; and Mr. H. Scudamore Stanhope had left nothing undone to make it a rare treat to the lovers of horticulture and arboriculture, as well as of mycology. Though himself unavoidably absent, Mr. Stanhope had placed his head gardener at the service of the Club, to show them the diverse beauties of the trimly-kept gardens and grounds, of which—to say nothing of many curious deciduous and evergreen trees—the clean-clipt yew hedges are a conspicuous feature. It was too late in the year to see the effect of the tasteful arrangement of the flowers, to harmonise with and not ignore and disown these old-world topiary triumphs, as also to realise the success of a cordon pear-wall, of which the abundant fruit had been gathered. But within the precincts of these charming gardens every lawn and slope was rich with dainty fungological treasures. Here Mr. Berkeley quickly found Geoglossum glabrum, G. Olivaceum, and G. difforme. Mr. Brooke gathered Clavaria curta under the yew trees—the elegant little Agaricus (Mycena) flavo-albus; ag. (Pleurotus) tremulus and applicatus; ag. cunifolius; ag. corticolor; Anthina flammea; Pistillaria quisquillaris, &c. Mr. Vyse detected Puccinia strioli growing on Carex; and there were many other discoveries. The mycological successes of the day, however, was a species of Nolanea and Hygrophorus fornicatus, both new to Britain. The Hygrophorus grew also on the Moccas Park lawn. There should have been a general hand-shaking here, but a shower of rain, though it lessened not the joy and enthusiasm at finding these treasures, dispersed the naturalists rather summarily. Not, however, before a goodly number of them had inspected the magnificent oaks of the Park, the gigantic denizens of Price's Walk, and the Holm Lacy Wellingtonia described by the Woolhope Commissioner in the Transactions of 1870. Several arboricultural curiosities—among them an American scarlet oak—were noticed by the club, despite the rain, which somewhat interfered with leisurely contemplation; but no member of the party deemed his outing a failure when, at 2.40, the express stopped abnormally at the Holm Lacy Station, and took the Club back to Hereford.

Here, while the general company examined and discussed the exhibition of fungi in the Green Dragon Assembly room, the Committee of the Wool

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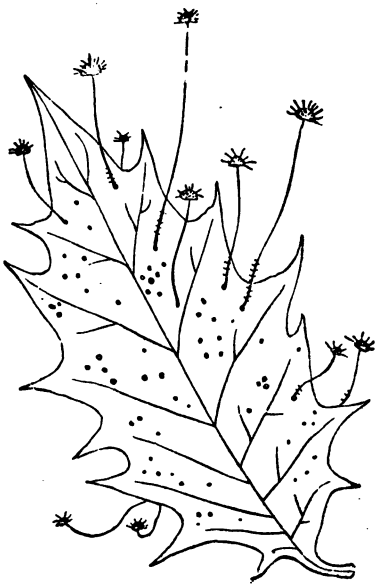

MARASMIUS HUDSONI Fr.

HUDSON'S MARASMIUS.

This very curious Plant which is here represented of its natural size, grows upon dead holly leaves. The Agaric is very small in size, and the pileus is thickly set with purple-brown bristles. Under the higher powers of the microscope its singular beauty is brought out in perfection. The whole Plant is thus seen to be covered with bristles and glandular hairs, on the gills the simple glandular hairs become developed into papillose cystids. The gills themselves are narrow, simple, and white. (*Cooke's "British Fungi"* p. 240—No 678)

This interesting Plant was found growing under a holly tree in the Belmont grounds, near Hereford, on one of the Fungus Forays of the "Woolhope Club," October, 1873.

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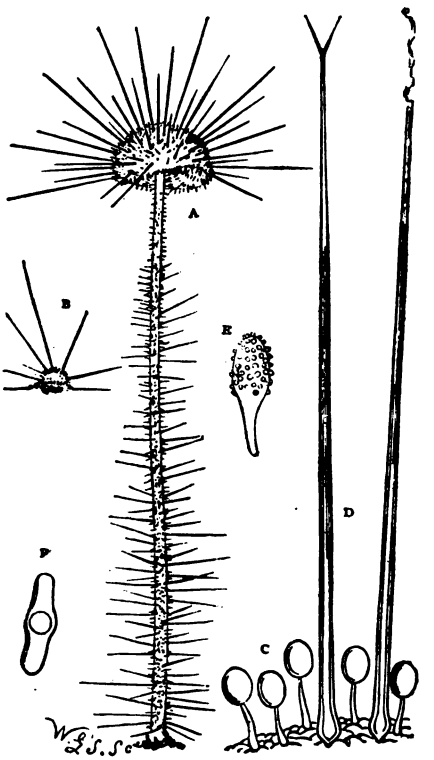

MARASMIUS HUDSONI Fr.

HUDSON'S MARASMIUS.

A.—The whole Plant fully developed. B.—A young Plant. C.—The glandular hairs. D.—The bristles, sometimes forked. E.—A glandular hair from the gills converted into a papillose cystid. F.—A spore with central nucleus, measuring 0004" .long.

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hope Club held a sitting in an adjoining apartment, the Rev. J. Davies, President, in the chair. Present: The Revds. Cooper Key, R. H. Williams, S. Clark, Mr. A. Armitage, Mr. O. Shellard, Mr. J. Griffith Morris, Mr. W. Swinburne, V.P., and several others. At this meeting the Editorial Committee of the past year was re-elected. The Revds. C. J. Robinson and W. C. Fowle, Mr. T. Algernon Chapman, M.D., and Mr. Arthur Armitage were re-elected vice-presidents for the ensuing year; and the Rev. James Davies (the President for 1873) was re-elected President for 1874.

Mr. Henry Carless, proposed and seconded at the last meeting, was duly elected a member; and the Rev. R. H. Cobbold, Rector of Ross, was proposed by Mr. A. Armitage, and seconded by the Rev. H. W. Tweed, for election at the next meeting. Arrangements were discussed for calling together the Editorial Committee at an early day; and on the proposal of the Rev. S. Clark, seconded by the Rev. H. C. Key, it was resolved that "in future two copies of every number of the *Hereford Times* containing particulars of the meetings of the Club, or papers read at them, be purchased by the Secretary, and preserved for the use of the committee."

There being no other business, the committee rejoined the general company, and proceeded to dinner. Among the fifty-four gentlemen present we noticed the following gentlemen, who took part in the week's proceedings:—The President, the Rev. James Davies, Moor Court; the Hon. Secretary, the Rev. Sir George H. Cornewall, Bart.; the Rev. M. J. Berkeley, F.L.S., &c., &c., London; Mr. C. E. Broome, F.L.S., &c., Bath; the Rev. William Houghton, M.A., F.L.S., &c., &c., Preston, Salop; Mr. James Renny, London; Mr. Edwin Lees, F.L.S., &c., President of the Malvern Field Club; Mr. C B. Plowright, King's Lynn; Mr. Worthington G. Smith, F.L.S., &c., London; the Rev. J. Vize, Welshpool; Mr. Wm. Phillips, Shrewsbury; Dr. Chapman; Mr. Thomas Cam; the Rev. J. La Touche and Mr. Lyall, Stokesay; the Revds. H. C. Key, Samuel Clark, R. H. Williams, A. Gray, J. F. Crouch, J. H. Jukes, W. Jones Machen, W. C. Fowle, H. W. Phillott, T. M. Beavan, and A. G. Jones; Colonel Symonds; Mr. J. F. Symonds; Dr. McCullough; Mr. Elmes Y. Steel; Mr. A. Armitage; Mr. T. Curley, F.G.S.; Mr. John Lloyd; Mr. J. Griffith Morris; Mr. H. C. Moore; Mr. W. Swinburne; Mr. Flavell Edmunds; Messrs. O. Shellard, Howse, With, Lane, Arthur Thompson, &c., &c.

At the close of the repast, at which, *inter alia*, were served up the vegetable beefsteak (Fistulina hepatica) and the delicate Hygrophorus pratensis, admirably cooked, and at which *Dindon aux truffles* was one *piece de resistance*, the Chairman (Rev. J. Davies) briefly proposed the health of the Queen. He then proceeded at once to express, as the mouthpiece of the Club, the gratification felt by it at the honour paid to it by the various mycologists—some of European reputation—who had accepted their invitation on this occasion, and of one he named especially, one veteran botanist and horticulturist, Mr. Berkeley. Their presence was not only a compliment to the Club and

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county, but also an earnest of the fungus wealth which the one contained and the other strove to popularise and illustrate. In this, as in most of the successful aims of the Club, Dr. Bull was the pioneer and the untiring prime mover. To him he (the President) owed the germ of the idea which he thought he might be permitted briefly to broach on this occasion, and which he hoped other members might co-operate in maturing at other meetings. He referred to an interchange by the Club members of grafts of choice apples and pears, to the end that the pomological resources of the county might be augmented and circulated, and that the Club, as a society, might combine in a work of usefulness and social enterprise which, in past time, at two different periods, had made the names of Viscount Scudamore and of Thomas Andrew Knight famous among the benefactors of Herefordshire.

The Rev. M. J. Berkeley, F.L.S., in acknowledging the compliment paid to him and his fellow guests by the Woolhope Club on this occasion, said, that as Chairman of the Horticultural Society's Fruit Committee, he could promise that any number of grafts which might be desired should be sent from the Chiswick Gardens to the Club, if it carried out the scheme suggested.

Mr. C. E. Broome also returned thanks for himself and his fellow guests.

The President then called upon Dr. Bull to introduce the subject of Sclerotia, which stood first on the list of papers for the evening.

Dr. Bull said he must first endorse what the President had so well said, by expressing his sense of the high honour Mr. Berkeley had done them by attending that meeting. It was a red-letter day in the annals of the Woolhope Club, and he was quite sure it was as gratifying to the members generally as it was to himself to see him there (hear, hear, and applause). He always welcomed most cordially the many scientific gentlemen who were good enough to join in these forays—Mr. Broome, from Bath, Mr. Houghton, from Preston, Mr. Renny, from London, Mr. Plowright, from King's Lynn, Mr. Vize, from Welshpool, Mr. La Touche from Stokesay, Mr. Worthington Smith, from London, Mr. Edwin Lees, from Worcester, Mr. Phillips, from Shrewsbury, and many others. He did not know what the Woolhope Club could have done without their kind assistance, and he was quite sure that it was a great advantage to Herefordshire to have its botanical treasures sought out by such sharp eyes and clever heads (hear, hear). It was not so very long since he was obliged to ask Mr. Lees to come and give them their first lessons on funguses in the field, and from that time, year by year, their meetings had increased in success. He would just remind them of the discoveries made by the Club last year. The forays, they would remember, were dreadfully wet, and they were not all of them so "perfectly happy" as some innocently expressed themselves in the Whitfield woods when the rain came pouring down in torrents (laughter). And yet they were never more successful. The rare Marasmius spodoleucus and Naucoria cucumis were found

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THE REMARKABLE TREES

OF

HEREFORDSHIRE.

THE RIVEN OAK.

MOCCAS PARK. 1873.

This curious old tree stands at the end of the pool in Moccas Park, at the water's edge. It has a split and gaping trunk with a measurement, false though it be, of 30 feet 9 inches in girth.

Sketched for "Gardener's Chronicle," by Worthington G. Smith, Esq., F.L.S.

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in Rotherwas wood; Tricholoma sejunctus, sulfurens, and resplendens were found at Whitfield and Vennwood, the last fungus new this year to Britain, but found also in Essex, in Middlesex, and Berkshire. Thelophora Sowerbei, Mycena rosellus, and Sistotrema confluens, all very rate plants, were gathered for the first time in Herefordshire last year. Mrs. Key had brought to the exhibition Gomphidius maculatus from the lawn of Stretton Sugwas. So far as is recorded, it was the first time it had been found in Britain; for, although it is figured in Berkeley's "Outlines," it was figured by mistake for gracilis. Another fungus, and one altogether new to science, was the Hygrophorus Houghtoni, discovered by Mr. Houghton on the Wrekin just after our meeting, and then found in a meadow below Dinedor, and on the Blorenge, at Abergavenny. Mr. Berkeley having convinced himself that it had never yet been described, named it after the discoverer. The next plant, new to England, and the most brilliant novelty of the year, was Cortinarius cinnabarinus, discovered by our friend Mr. Renny, on the Downton Slope. It is a small agaric, growing singly or in crowded clusters; but its tint is so gorgeous and refulgent as to defy water-colours to reproduce—indeed, the most luminous scarlet vermillion pales before it. The plant was exhibited here last year. There is still one other addition that Herefordshire made last year to the British flora, and that was Agaricus aureus, and one of the most noble plants of the order. It was found by Mr. Renny growing in two grand clusters in the fir plantation near the Roman Catholic Church at Belmont. There were four or five plants in each group, the largest nearly a foot high, and measuring eleven inches across the pileus. Its colour was a golden buff, with a soft rich tone over it quite peculiar to itself. Thus Herefordshire, thanks to Mr. Renny, made the two most striking additions of the year to the British flora. [Water-coloured sketches of these several funguses were sent round the tables for examination, and were much admired.] And what shall we do this year, you ask? Good work, I have no doubt, though such great prizes must not always be looked for. He had an inkling of some new things, but all he would tell them was that if they came to the *conversazione* to which Mr. Cam had so kindly invited them that evening, they should see plants that few eyes had before looked upon, for if they had ever been found before they had never been recorded. The next subject he had to mention to them was a suggestion which had been made to him by Mr. Edwin Lees, the President of the Malvern Naturalists' Field Club. He had written to him when he thought that he could not be here himself, and thus he would read it to them: "It is very remarkable," says Mr. Lees, "that every autumn there are accounts of deaths from eating poisonous funguses taken for mushrooms, or else mushrooms in a bad state. This wants looking into in a more popular way than has yet been done. I mean by a cheap pamphlet, with wood-cut illustrations, that members of Naturalists' Clubs might distribute among rural folk or the poor in towns, for it is generally some of the lower classes that get ill or poisoned by eating funguses and not getting relief in time.

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Mr. Newman published an account of all the English butterflies, with cuts of them, for sixpence, and why should not this be done with edible and poisonous funguses? I think it a feasible project and commend the idea to your consideration" (hear, hear). This idea of Mr. Lees' did seem to him feasible, but the best person to whom he could commend it was a spirited publisher; why not the publisher of Mr. Newman's "Butterflies?" (hear, hear). He had also received a letter from Professor Buckman, from Dorsetshire, stating how much he and his family continued to eat and enjoy the St. George's Agaric, the Champignon, the large Puff-ball, &c., but as this was by no means uncommon, he need not dwell further upon it. A heavy blow and great discouragement had lately been given to the eating of funguses, and the presence there of his friend Mr. La Touche called upon him to make some remarks upon the subject (laughter). He had a vivid recollection of Mr. La Touche's "Counterblast" against them (laughter). They were aware that an unfortunate gardener had lately presented some mushrooms to a fellow servant with whom he had before had a quarrel. He had wished, doubtless, to make up their differences by presenting her with the most delicious dish he could provide. The result was most unfortunate. The mushrooms would seem to have been in bad condition, or not true ones, for the exact facts were not known. The poor girl died, and the man was committed to trial for murder. He was of course acquitted, and the opportunity was taken of issuing a special warning against the eating of funguses. The worthy Judge, and, at his request, the newspapers generally, took up the subject, and the rules for distinguishing the good from the bad ones were laid down at length. Now, although this was very well meant, he could not help saying that it was very absurd. Such rules can only be useful to those who study the subject, and certainly not to common people. For them the knowledge of each fungus by its own individual appearance and characters is the only one means of information. They would understand him better if he gave them a practical illustration of what he meant. Suppose anyone were to tell Betty Jones, the watercress-seller, the proper means of distinguishing watercress from the poisonous water-hemlock or brook-lime by their botanical characters, she would stare at him with amazement, and either think that he was crazy, or that he wanted to make a fool of her, and most probably the latter; but, supposing her to have the respect due to a customer, she would probably answer, "Lord bless you, sir, I don't want to know nothing of the kind; I don't want hemlock nor brook-lime; I knows watercress whenever I sees it, and I don't want nothing else." And if her monitor is wise, he will buy threepenny worth at once (laughter). Now if the time ever should come when Betsy Jones will gather funguses for sale—that is to say, when she may find people wise enough to buy them (laughter)—she will know them by their own characters, and not by their differences from others. If she should ever gather and sell the orange milk agaric (Lactarius deliciosus), for example, and anyone should

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tell her to be careful that she did not gather the poisonous Lactarius torminosus, the destroyer, which has yellow milk and a woolly margin, she would say again, "Lord, sir, I don't want nothing to do with torminosus, or woolly margins, or yellow milk. I goes by orange milk and green stains—them's my marks, and I don't want nothing else" (laughter); and the good dame's philosophy is right if funguses have the distinctive characters we know them to possess. It is by positive and not by negative characters that they must be practically known if they ever are to be known (hear, hear). One other point he would also mention, and that was one which seemed never to be thought of, namely, that the fungus should be ripe and mature to be eaten in perfection. Many present, for instance, had not that respect they should have for the vegetable beef-steak (hear, hear). "It was tough," or "It tasted of oak bark;" but had they taken care that it was ripe when gathered? Mr. Berkeley had said somewhere that he had once tasted it and found it excellent, which he supposed was due to the skill of his friend's cook. He (Dr. Bull) would suggest that he had once tasted it fully grown, soft, and ripe before it was submitted to that excellent cook's manipulation. If the vegetable beef-steak was really ripe, it was not by any means a dish to be despised (hear, hear). They all knew how necessary it was to catch the proper time of ripening of the different pears. Until the right time they were often uneatable. He had a pear-tree in his garden—the Beurre d'Aremberg, if he remembered rightly—which required to be kept a few days after it had become yellow and soft. When it first becomes yellow, and you think it ripe, it tastes so like the scents prevailing in a druggist's shop that it has got the name in his family of "the medical pear," but in a few days more the disagreeable flavours soften down to an exquisitely rich, delicious fruit. They all know the saying with reference to the Jargonelle pear, and Mr. La Touche likes popular proverbs (hear, hear, and laughter), "That you must sit up in the tree all night to catch it in perfection." Now, if all this care is necessary with reference to a fruit which takes more months to grow than the fungus takes days, one ought to be electrically sensitive to the precise moment of maturation of a mushroom (hear, hear). They had to be sure, therefore, in judging of a fungus that it was not only in good condition, but that it was ripe when gathered (hear, hear). Dr. Bull then proceeded to introduce the subject of Sclerotia for discussion, for which he had been announced. He described them as small, hard, nodular bodies, varying in size and shape, and colour, which were often observed on decaying agarics and other vegetable substance. They were made into a separate class of agarics at the end of the last century, and many different kinds were named. It was observed, however, that they never bore fruit themselves, but were constantly the source from which fruit bearing agarics were produced, and further research proved that instead of being a separate order themselves, they were but one condition of other funguses—consisting in fact of compact masses of mycelium—dormant states of more perfect plants. Dr. Bull then went into more minute details, and

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exhibited fresh specimens and careful drawings of three different kinds of funguses with the Sclerotia from which they sprang. He showed Agaricus tuberosus springing from Sclerotium cornutum; Agaricus cirrhatum springing from Sclerotium trun corum; and Peziza tuberosa, with its hard, corky, Sclerotium some two inches underground (applause).

Mr. PLOWRIGHT, of King's Lyon, then made some observations on Peziza tuberosa and its mode of growth, and expressed his opinion that Sclerotia were indeed nothing more than the mycelium of different funguses in a compact state, and the better able to withstand the different conditions as to moisture and temperature to which they would have to be subjected (applause).

The Rev. M. J. BERKELEY, who on rising was again received with warm and continued applause, expressed his thanks for the very kind reception he had met with, and said that it was a very great pleasure to himself to take a part in so interesting a meeting. He then went on to discuss the several points which had been raised with reference to the growth of Sclerotia, and concluded by saying that very much more required to be learnt about them—although there was no doubt as to their general nature—namely, that they were dormant conditions of more perfect plants.

MR. PHILLIPS, of Shrewsbury, then read his paper on "The Fungi of Charcoal Beds."

This was followed by a lively and interesting paper on "The Fungi of Gerarde's Herbal," by Mr. Plowright, of King's Lynn.

At this point—as the country members were dispersing to catch the trains in various directions—the President, after proposing a vote of thanks to those gentlemen friends of the Club, who had opened their parks, gardens, and houses to receive the foragers during the week, announced that the meeting would now adjourn to the house of Mr. Cam and finish the evening at a *conversazione* open to all who were able to avail themselves of that gentleman's hospitable invitation. Here the visitors enjoyed a rare treat in the exhibition by Mr. Berkeley of some most interesting volumes of plates and drawings. 1. Original drawings of Fries, the Swedish mycologist, from the Museum at Upsal. 2. Copies of drawings of Ceylon fungi, by a native artist, named Alwis. 3. A number of drawings of Himalayan fungi, by Dr. Hooker. These were inspected lovingly and leisurely; and this done, Mr. C. E. Broome kindly read some notes on new genera, which he has placed at the disposal of the Club for publication; and then Mr. Renny read an equally interesting paper on certain minute and microscopic fungi, and exhibited what Mr. Berkeley truly called his "magnificent moulds," the curiosity of which, bewraying as it did the perfect work of a Divine Artificer, in things minute as well as grand and stupendous, led one naturalist to recall the apt words of old George Herbert—

> Thou art in small things great, not small in any;
> Thy even praise can neither rise nor fall.
> Thou art in all things one, in each thing many;
> For Thou art infinite in one and all.

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THE REMARKABLE TREES

OF

HEREFORDSHIRE.

THE PROMONTORY OAK.

MOCCAS PARK, 1873.

This tree, with its huge projecting limb, grows on a sort of promontory, on the south side of the pool in Moccas Park, with a companion almost equally interesting and picturesque Knotted and gnarled with roots creeping on the surface of the gronnd, these trees offer a singular contrast to the fine oaks shooting out of the soil on the higher situations in the Park.

Sketched for "Gardener's Chronicle," by Worthington G. Smith, Esq., F.L.S.

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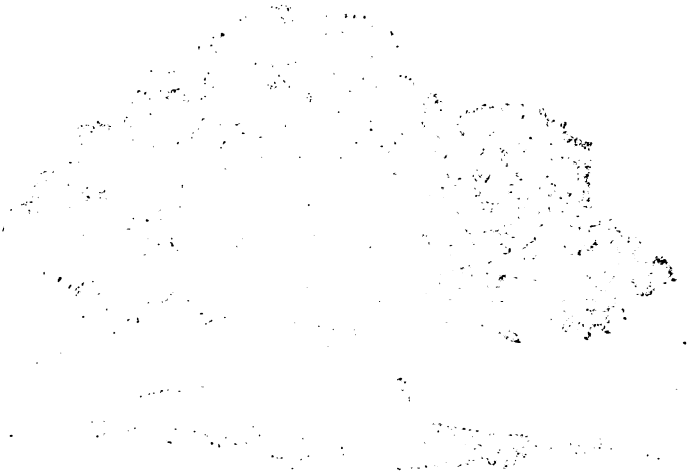

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The evening closed with warm expressions of thanks to Mr. Cam.

A brighter morning, albeit cold and frosty, succeeded on Friday, when, on the kind invitation of Sir George Cornewall, Hon. Sec. of the Club, the President and fifteen mycologists drove out to Moccas, passing over the private bridge, and along the Scotch fir and yew-tree avenue of Mornington walk, and so in due course to Moccas. The noble oaks of the beautiful demesne have been already commemorated by the Club Commissioners; but it awoke a new delight in those who visited the park for the first time to gaze upon oaks that could reckon a cool thousand years of existence, and point to a birth-date earlier than that of the knight who sleeps in the chancel of the excellently restored Norman church. The Tall Oak, the Club Oak, the Moccas Oak, the Weeping Oak were severally viewed; but what struck the visitors as much as anything was the great number of healthy giant trees that might be reckoned by tens, though they would have been noteworthy even as units. There were also some remarkable ash, and wyche elms, and other noble timber trees, which not even the extreme richness of mycological treasures lying beneath and around them could deprive of a large share of the enthusiasm of every visitor. Among the fungi gathered was the rare and beautiful Hygrophorus Calyptræformis, and H. Russo-coriaceus, so called from its all-pervading odour of Russian leather; Agaricus (Pleurotis) subpalmatus; Ag (Entoloma) jubatus; Clavaria rufa, umbrina, and fusiformis. The "Tall Oak" had many fine specimens of Polyporus Lucidus upon it, alas! that it should be so. There were found, too, Cyphella galeata, on moss; Sphærobolus stellatus; Hypoxylos serpens; Sphæria confluens; the rare Thelephora multizonata, which created a sensation in London last year; and in a decaying oak stick Mr. Berkeley pointed out Tremella sarcoides passing into Bulgaria sarcoides, of which it seems an imperfect state; besides many other fungi which defy enumeration.

During greater part of the day the visitors had the advantage of a lovely sunshine; the bow was seen in the clouds at one period of the afternoon in exceeding brilliancy; and, towards evening, the forked lightning, which frequently lit up the dusk of the gathering gloom, did not avail to disturb the satisfaction with which the visitors partook of a handsome and substantial dinner provided for them at Moccas Court, crowning the personal attention and kindness during the day. For all this the President, before quitting the hospitable board, took occasion to express the thanks of the whole party, which about six o'clock proceeded to return to Hereford, Dr. Bull occupying on the back-journey the seat of the President, who was homeward bound. A *conversazione* at Dr. Bull's wound up the evening, and in effect concluded the gatherings of a week, which, notwithstanding the lateness of the season, and the average unfavourableness of the weather, will be remembered with satisfaction and complacency by every Woolhopian who took part in them, and will, we trust, have proved sufficiently attractive and interesting to their guests from other centres to induce them to revisit Hereford on the occasion of other congresses for the same object.

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THE FUNGI OF CHARCOAL BEDS.

By Mr. PHILLIPS.

Throughout the vegetable world there are few things more remarkable than the curious habitats of fungi. In no other class of plants do we find so varied a choice of material on which to grow, or so wide a geographical range through which to flourish. The mere enumeration of the various substances they live upon would occupy the evening and would include the simplest as well as the most highly organised bodies. They inhabit nearly every plant known to botanists from the humble moss to the giant oak, both in its living and decaying state; in one case seating themselves on the leaf, in another on the stem, and in a third on the roots. Six hundred genera of plants to say nothing of species are enumerated by Mon. Roumeguène as the victims of parasitic fungi, and this list is far from complete. They do not confine themselves to vegetable substances, for, as some one has happily said, "they are carnivorous in their tastes;" they fix themselves on horn, leather, hair, undressed hides, and on a considerable number of animal tissues, in some cases even before vitality has forsaken those tissues, and hence many of the most fatal diseases to which "flesh is heir" have been regarded as arising from these parasites. Nearly every kind of food used by man is subject to their growth as well as a variety of pharmaceutical compounds and poisonous mixtures. Even the hard surface of minerals is not proof against their invasion, for they have been known to grow on iron and glass. Their range of situation is no less remarkable. They enter into our houses and find a lodgement in every room—the library, the wardrobe, the cupboard, the cellar. They thrust themselves into notice in our best kept gardens; they spread themselves over the most highly cultivated farms; they develope in the depths of the deepest mines; and are observed throughout all elevations of the earth's surface up to 18,000 feet above the level of the sea. Such in a few words is the broad area over which these strange plants extend themselves. There are, however, certain particular spots and materials which are more frequented by their presence than others, where they appear to find some special food they most prize. Quoting from the list just referred to, I find on the beech (Fagus sylvatica) as many as 220 species have a habitat, on the oak (Quercus robur) 290 species, and even on those minute plants, mosses, there are said to grow 45 species. Amongst animal substances there are given, as found on various materials derived from our domestic bull (Bos Taurus) 57 species, on insects 35 species, and on birds 9 species. Although we are not able to present a long list as inhabiting charcoal beds and burnt ground, we claim for such places the character of being favourable spots on which some interesting plants are discovered. For a long time it has been

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observed that the growth of fungi follows the action of fire on wood and earth. The Rev. Mr. Berkeley tells us in his introduction to "Crytpogamic Botany" (p. 292) that "in Germany Morels affect more especially these places where wood has been burnt, and the collection was so lucrative as to induce the peasantry to destroy the forests by fire with a view to favour their growth; a practice which was at length checked by the enacting of special laws." In his introduction to "The Outlines of Fungology" we are also informed that "a certain Polyporus used for food in Italy is raised on hazle stumps by simply charring them partially and then supplying them with a proper quantity of water." In M. Rouniguère's work ("Cryptogamie Illustrée") already referred to, we are informed that "Captain Durriew, when crossing some plains in Algeria which had lately been burnt by the Arabs during the war in that country, was able to collect a great number of fungi upon grass stubble partly consumed, and upon wood the bark of which had been charred by fire." The same author also says that large species of fungi are found on charcoal beds in the forests of France. Those who have been in the habit of searching the woods of Shropshire and Herefordshire for fungi could not have failed to observe many corresponding facts. These counties supply large quantities of timber for building, and the practice of landowners of falling it at certain periods, when charcoal is usually made, ensures a succession of these beds of various ages. It is a matter of surprise that any living organisms should find a pabulum after the ordeal of fire which these spots undergo; yet it is a fact that very shortly after their being used a growth of fungi makes its appearance, while yet the the surface consists of nothing more than loose fragments of charcoal several inches in depth. Some conditions are produced highly favourable to the growth of Mycelium arising from spores which have either escaped the action of the fire or been conveyed by the wind or animals and deposited in their place of growth. I may here mention a fact that came under my own observation in the early part of this year, which tends to show that at least one species of lichen may take possession of a similar habitat. While in North Wales in the month of April I saw on the side of a public road a space of burnt ground some 12 feet in circumference, probably the recent encampment of gypsies, nearly the whole surface of which was covered by a beautiful collema, its thallus thickly strewn with dark brown apothecia, the finest growth of the kind I ever witnessed. An interesting question naturally occurs here which we cannot pass over without a remark, namely, how are these phenomena to be accounted for? Why should there exist this singular sequence of fire and fungi? The most probable explanation—the one most consonant with our knowledge of vegetable growth—is that the chemical constituents of the ground become so altered as to supply the ingredients most appropriate to the sustenance of fungi. I must content myself with bringing before your notice one fact only in confirmation of this view. Professor Church has given us in the "Journal

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of Botany" (the August number) a very careful analysis of Lycoperdon giganteum, from which it appears that the ash of that fungus yields the following ingredients:—

	In 100 parts.
Phosphorous pentoscide	46.19
Potash...	35.48
Soda	6.95
Lime	2.47
Ferric oxide	1. 8
Silica	0.66
Other substances and loss	7.71
	100.000

Now these very substances are all present in great abundance in charcoal beds, and wherever wood, straw and other vegetable matter have been consumed by fire. If we take Lycoperdon giganteum as being a fair representative of the chemical composition of fleshy fungi, we need not be surprised to find burnt ground productive. Should it be urged that the ash does not represent more than one per cent. of the whole plant in its living state, the reply is that it may easily obtain its 90 per cent of water elsewhere, but not so readily its mineral constituents, and they are indispensible. Thus it is seen that these beds supply a table in the forest spread richly with all those delicacies that fungi love to feed upon. The following is the list of species observed to grow on these places as far as I have been able to ascertain them, but doubtless it can be largely supplemented by those who have made fungi their study :—Agaricus fumosus (Fr.), polius (Fr.), laccatus, atratus, umbelliferus, fibula, scaber, carbonarius, decipiens, sapineus, canobrunneus (Batsch.); Lactarius quietus (Fr.); Russula nigricans (Fr.), Adusta (Fr.), ochroleuca (Fr.), fragilis (Fr.); Cantherellus umbonatus (P.), radicosus (B. and Br.); Polyporus perennis (Fr.); Thelephora laciniata; Typhula; Lycoperdon saccatum (Vahe), gemmatum (Fr.); Reticularia applanata (B. and B.); Rhizina undulata (Fr.); Helvella crispa, lacunosa; Peziza cochleata (Hud.), trachycarpa (Curr), leiocarpa (Curr), carbonaria (A. and S.), pustulata (Pers.), melaloma (A. and S.), rutilans (Fr.), subhirsuta rar. macrocystus (Cooke), schizospora (Phillips), omphalodes, violacea; Ascobolus crouani (Cooke), atrofuscus (N.S.); Hynotria Tulasnei (B. and Br.); Sphœria (N.S. ?). Amongst the white spored in this list, Agraicus atratus deserves notice because of its inconspicuous character, having a pileus much the colour of the ground on which it grows, therefore easily overlooked, and its close resemblance to Cantherellus radicosus. On closer examination its thin broadish gills will at once enable us to distinguish it from the last named, which has narrow raised ribs rather than gills. This is not very common in Shropshire. Among the brown spored the two commonest are Agaricus scaber and A. Carbonarius. They abound in the Wrekin woods and the Whitcliffe woods. Neither is difficult to recog-

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nise, A. scaber having a fibrous, tan-coloured pileus and stem, and A. Carbonarius a tawny viscid pileus, squamulous stem and clay-coloured gills. This last species often thrusts itself up through the charcoal as if it had attained a considerable development before showing itself on the surface. Ag. decipiens, which is nearly allied to this species, I have never yet found in Shropshire. Passing to the Ascigeous fungi—that is to those which have their sporidia enclosed in asci or sacs—we find several interesting denizens of the charcoal beds. Rhizina undulata has not been found in Shropshire or Herefordshire, though said to be not uncommon where heath has been burnt down. The genus Peziza is somewhat largely represented. Peziza trachycarpa of Mr. Curry is very common in Shropshire, but owing to its dark colour it requires to be searched for attentively, otherwise it may be overlooked. The sporidia are very beautiful and make an interesting object for the microscope. P. leiocarpa, Curr, I have never been fortunate enough to find in Shropshire. A large irregular Peziza occurred this autumn on the charcoal beds of the Ercal—an outlier of the Wrekin—which being a rare species requires notice, viz., Peziza pustulata, Pers. Some of the specimens measured one inch across. It is not an uncommon circumstance to find large masses of bright scarlet or dull red on the surface of the charcoal, which on close inspection are found to consist of a species of Peziza crowded into layers extending to the size of a square foot or more. One of the most common is Peziza Melaloma, A.S.S., but not easily distinguished from some neighbouring species. P. Omphalodis is another common one appearing in large patches. This is more easily recognised by a white tomentum generally surrounding its base, which a though fugaceus may be generally found on the younger individuals. A variety of P. Subhirsuta, named by Mr. Cooke Var. Moevocystus, also assumes a crowded growth. I am not quite satisfied with this species being referred to subhirsuta, and venture to suggest that it should have a specific rank. P. Setrizospria is not common, but may be easily recognised by its smooth sphœrical sporidia and the tendency of the episgrove to split and discharge a nucleus. I now wish to call your attention to a very beautiful Ascobolus, which there is every reason to believe is new to our flora if not new to science. This occurred in company with P. postulata. The whole plant when young is of a dark brown colour, and on maturing the disc becomes nearly black. The sporidia are broadly elliptical and roughly granulated on the exterior. The nearest species to it is that figured by M. Boudier in his excellent monograph on this genus under A. vividis (Curr). An interesting tuber, Hynotria Tulasnei (B. and Br.), has occurred once, a single specimen, immatura. The last plant in the list is a minute Sphæria, found on burnt soil in Altringham Park. The ostiolum alone is visible above the surface of the ground, the perethecium being below, surrounded by a densely entangled mass of septate transparent threads. The sporidia are almond shape, black, with a hyaline tip at the lower end. I have not yet been able to identify this with any published species, and should it be new it is proposed to call it Sph. carbonaria.

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LIST OF FUNGUSES OBSERVED AT THE FUNGUS FORAYS AND EXHIBITION OF THE WOOLHOPE NATURALISTS' FIELD CLUB, OCT. 20TH—25TH, 1873.

By Dr. BULL.

The Forays of 1873 were held at the very close of the Fungus Season, and the season, too, being one of the most unfavourable for mycelium growth that has been known for many years. The season of 1872—one of the most rainy of years—had been very bad, but 1873 has been much worse. July and August were very wet months (having a rainfall of nearly 3 and 3½ inches respectively), but the temperature was not only below the average, but extremely variable, and to this must be attributed the great scarcity of funguses. This list is therefore comparatively small. It is, however, a very interesting one. It contains no less than four species new to Great Britain, and the accuracy of the names of those found is guaranted by the presence of so many eminent botanists who did the Club the honour to attend its meetings.

AGARICUS.

Amanita.

Amanita vaginatus, *Bull.*
,, Phalloides, *Fr.*
,, muscarius, *L.*
,, rubescens, *P.*

Lepiota.

Lepiota procerus, *Scop.*
,, granulosus, *Batsch.*

Armillaria.

Armillaria melleus, *Vahl.*

Tricholoma.

Tricholoma sejuctus, *Sow.*
,, flavo-brunneus, *Fr.*
,, rutilans, *Schœff.*
,, imbricatus, *Fr.*
,, terreus, *Schœff.*
,, saponaceus, *Fr.*
,, cuneifolius, *Fr.*
,, lascivus, *Fr.*
,, inamœnus, *Fr.*
Tricholoma acerbus, *Bull.*
,, grammapodius, *Bull.*
,, humilis, *Fr.*
,, subpulverulentus, *Fr.*
,, innctus.

Clitocybe.

Clitocybe nebularis, *Batsch.*
,, odorus, *Bull.*
,, cerussatus, *Fr.*
,, pithophyllus, *Fr.*
,, fumosus, *P.*
,, geotrupus, *Bull.*
,, cyathiformis, *Fr.*
,, brumalis, *Fr.*
,, laccatus, *Scop.*
,, candicans, *Fr.*
,, clavipes, *Fr.*

Pleurotus.

Pleurotus dryinus, *P.*
,, tremulus, *Schœff.*

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DESCRIPTION OF PLATE.

Fig. 1—3.– *CORTINARIUS (DERMOCYBE) CINNABARINUS. Fr.*

Pileus fleshy, obtuse, silky, then glabrous, of *scarlet-cinnabar* colour, with a fibrillose veil. Stem stuffed, even, short: Gills darker, adnate, broad, *subdistant*. It grows in bushy places, and is by no means rare with us. The stem is firm, now and then bulbous never pale yellow, by which and by its brilliant appearance it differs from *Cortinarius purpureus*, Bull. *C. cinnamomeus* is near it but different. Edge of gills unequal. Odour of radish. Fries "Epicrisis." Edit. alt. p, 370. No. 127.

This brilliant addition to the British Flora was first found by Mr. Renny growing at Downton, Herefordshire, in 1872, when the crop was abundant and a considerable space of ground was made almost dazzling by the brilliancy of the clusters. The specimens here figured differ but little from Fries description. The gills which are very numerous, are usually of the same tint or very slightly more dull then the pileus. The odour of radish, mentioned by Fries, was not observed here. Specimens have been found every year growing on that portion of the higher slopes of the Downton grounds, since named by fungologists "Renny's Promontary." (See Woolhope Transactions).

Fig. 4—5. –*TYPHULA ERYTHROPUS. Fr.*

See Cooke's "Handbook of British Fungi." Vol. 1, p. 341. No. 999; and Fries "Epicrisis"—p. 683. No. 3. Found at Dinmore, October, 1873.

Fig. 6—7.—*TYPHULA PHACORRHIZA. Fr,*

See Cooke's (ibid) p. 341. No. 1002; and Fries (ibid) p. 683. No. 5.

Grown artificially by Dr. Bull from *Sclerotii*, found by Mr. Renny on a decaying *Russula* near Backbury Camp.

Woolhope Fungus Exhibition, October, 1873.

Fig. 8—10.—*HYGROPHORUS RUSSO-CORIACEUS, B. & Mill.*

See Cooke's "British Fungi." Vol. 1, p. 200. No. 563; Fries "Epicrisis." Edit. alt. p. 414. No. 35.

Not uncommon in well kept lawns in Herefordshire, Moccas Park, Holme Lacey, and Garnstone (where it grew in small rings and scented the air strongly, October, 1874).

Fig. 12—15.—*AGARICUS (COLLYBIA) TUBEROSUS, Bull.*

See Cooke's "British Fungi." Vol. 1, p. 58. No. 150; Fries "Epicrisis." Edit. alt. p. 119. No. 376.

Very common on decaying Funguses and amongst leaves, in the oak woods of Herefordshire, where the *Sclerotii* are frequently to be met with.

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W.G.Smith.lith. Vincent Brooks Day & Son.Imp.

1–3. Cortinarius (Dermocybe) cinnabarrinus. Fr.
4–5 Typhula erythropus. Fr, 6. 7. T. phacorrhiza. Fr.
8–10. Hygrophorus russo-coriaceus. B & M.
12–15. Agaricus (Collybia) tuberosus. Bull.

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Pleurotus sub-palmatus, *Fr.*
,, applicatus, *Batsch.*
COLLYBIA.
Collybia radicatus, *P.*
,, fusipes, *Bull.*
,, conigenus, *P.*
,, cirrhatus, *Schum.*
,, tuberosus, *Bull.*
,, tenacellus, *P.*
,, dryophillus, *Bull.*
MYCENA.
Mycena elegans, *P.*
,, rubo-marginatus, *Fr.*
,, purus, *P.*
,, galericulatus, *Scop.*
,, polygrammus, *Bull.*
,, alcalinus, *Fr.*
,, epipterigenus, *Scop.*
,, vulgaris, *P.*
,, capillaris, *Schum.*
OMPHALIA.
Omphalia stellatus, *Sow.*
,, fibula, *Bull.*
VOLVARIA.
Volvaria gleiocephalus, *Fr.*
ENTOLOMA.
Entoloma sinuatus, *Fr.*
,, jubatus, *Fr.*
,, costatus, *Fr.*
,, nidorosus, *Fr.*
CLITOPILUS.
Clitopilus prunulus, *Scop.*
NOLANEA.
Nolanea icterinus, *Fr.*
PHOLIOTA.
Pholiota radicosus, *Bull.*
,, squarrosus, *Mull.*
,, adiposus, *Fr.*
,, spectabilis, *Fr.*
,, marginatus, *Batsch*
HEBELOMA.
Hebeloma fastibilis, *Fr.*
FLAMMULA.
Flammula scambus, *Fr.*
Flammula hybridus, *Fr.*
STROPHARIA.
Stropharia æruginosus, *Curt.*
,, squamosus, *Fr.*
HYPHOLOMA.
Hypholoma sublateritius, *Fr.*
,, capnoides, *Fr.*
PSILOCYBE.
Psilocybe semi-lanceolatus. *Fr.*
,, spadiceus, *Sch.*
COPRINUS.
Coprinus atramentarius, *Fr.*
,, niveus, *Fr.*
,, lagopus, *Fr.*
BOLBITIUS.
Bolbitius fragilis, *Fr.*
CORTINARIUS.
Cort. (Phlegmacium) cœrulescens, *Fr.*
,, (Myxacium) elatior, *Fr.*
LEPISTA.
Lepista nuda, *Bull.*
,, personata, *Fr.*
PAXILLUS.
Paxillus panuoides, *Fr.*
HYGROPHORUS.
Hygrophorus hypothejus, *Fr.*
,, pratensis, *Fr.*
,, virgineus, *Fr.*
,, niveus, *Fr.*
,, russo-coriaceus, *B. & M.*
,, ceraceus, *Fr.*
,, coccineus, *Fr.*
,, puniceus, *Fr.*
,, fornicatus, *Fr.*
,, conicus, *Fr.*
,, pscittacinus, *Fr.*
,, calyptræformis, *B. & Br.*
GOMPHIDIUS.
Gomphidius viscidus, *Fr.*
,, stillatus, *Strauss.*
LACTARIUS.
Lactarius torminosus, *Fr.*
,, turpis, *Fr.*
,, controversus, *Fr.*

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Lactarius blennius, *Fr.*
,, hysginus, *Fr.*
,, uvidus, *Fr.*
,, vellereus, *Fr.*
,, deliciosus, *Fr.*
,, glyciosmus, *Fr.*
,, volemum, *Fr.*

RUSSULA.

Russula nigricans, *Fr.*
,, furcata, *Fr.*
,, rosacea, *Fr.*
,, sardonia, *Fr.*
,, rubra, *Fr.*
,, vesca, *Fr.*
,, emetica, *Fr.*
,, fragilis, *Fr.*

CANTHARELLUS.

Cantharellus cibarius, *Fr.*
,, umbonatus, *P.*

NYCTALIS.

Nyctalis parasitica, *Fr.*

MARASMIUS.

Marasmius urens, *Fr.*
,, peronatus, *Fr.*
,, oreades, *Fr.*
,, caulicinalis, *Fr.*
,, rotula, *Fr.*
,, Hudsoni, *Fr.*

PANUS.

Panus stypticus, *Fr.*

LENZITES.

Lenzites betulina

BOLETUS.

Boletus luteus, *L.*
,, elegans, *Schum.*
,, flavus, *With.*
,, laricinus, *Berk.*
,, granulatus, *L.*
,, luridus.
,, scaber.

POLYPORUS.

Polyporus Schweinitzii, *Fr.*
,, perennis, *Fr.*
,, squamosus, *Fr.*
Polyporus picipes, *Fr.*
,, lucidus, *Fr.*
,, giganteus, *Fr.*
,, sulfureus, *Fr.*
,, hispidus, *Fr.*
,, dryadeus, *Fr.*
,, betulinus, *Fr.*
,, applanatus, *Fr.*
,, fomentarius, *Fr.*
,, igniarius, *Fr.*
,, ulmarius, *Fr.*
,, annosus, *Fr.*
,, violaceus, *Fr.*

MERULIUS.

Merulius tremulosus, *Schræd.*
,, lacrymans, *Fr.*

FISTULINA.

Fistulina hepatica, *Fr.*

HYDNUM.

Hydnum repandum, *L.*
,, zonatum, *Batsch.*
,, auriscalpium, *L.*
,, ochraceum, *P.*

RADULUM.

Radulum orbiculare, *Fr.*

PHLEBIA.

Phlebia merismoides, *Fr.*

GRANDINIA.

Grandinia granulosa, *Fr.*

KNEIFFIA.

Kneiffia setigera, *Fr.*

CRATERELLUS.

Craterellus cornucopioides, *Fr.*

THELEPHORA.

Thelephora multizonata, *B.* and *Br.*
,, laciniata, *P.*

STERGUM.

Stereum hirsutum, *Fr.*

HYMENOCHÆTE.

Hymenochæte rubiginosa, *Lev.*

AURICULARIA.

Auricularia mesenterica, *Bull.*

CORTICIUM.

Corticium giganteum, *Fr.*

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Corticium cæruleum, *Fr.*

CLAVARIA.

Clavaria vermiculata, *Scop.*

,, curta. *Fr.*

,, rufa. *Fr.*

TYPHULA.

Typhula phacorrhiza, *Fr.*

TREMELLA.

Tremella mesenterica, *Retz.*

LYCOPERDON.

Lycoperdon saccatum, *Vahl.*

,, pyriforme, *Sch.*

,, echinatum, *Sow.*

SCLERODERMA.

Scleroderma vulgare, *Fr.*

CYATHUS.

Cyathus striatus, *Hoffm.*

ANTHINA.

Anthina flammea, *Fr.*

TUBERCULARIA.

Tubercularia granulata, *P.*

HELVELLA.

Helvella crispa, *Fr.*

,, elastica, *Bull.*

MITRULA.

Mitrula cucullata, *Fr.*

GEOGLOSSUM.

Geoglossum olivaceum, *P.*

,, glutinosum, *P.*

,, glabrum, *P.*

PEZIZA.

Peziza succosa, *Berk.*

,, aurantia, *Fr.*

BULGARIA.

Bulgaria inquinans, *Fr.*

,, sarcoides, *Fr.*

TUBER.

Tuber æstivum, *Vitt.*

XYLARIA.

Xylaria polymorpha, *Grev.*

,, hypoxylon, *Grev.*

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NOTES ON NEW GENERA.

By C. E. BROOME, ESQ., F.L.S.

In his admirable address to the Linnæan Society, in May, 1873, Mr. Bentham alludes to the shortcomings of our countrymen in physiological botany. He says: "While preparing a few notes on the recent progress of the study of vegetable anatomy and physiology, I have been struck by the observation made by more than one critic in this country, and commented upon in some foreign journals, that we in England are in this respect some way behind our continental neighbours—that for instance the most important investigations and consequent discoveries relating to the incipient history of cryptogamic plants have been made in France and Germany—and that we are, in short, comparatively deficient in what the Germans are pleased specially to distinguish by the names of Scientific Botany and Zoology. Without admitting for a moment that there is less of science in the study of comparative anatomy, the mutual relations and consequent natural arrangement, and the geographical distribution of the higher animals and plants than in that of microscopic structure, we may acknowledge that there may be some truth in the remark that, with few exceptions, we have not excelled in that long, patient, and tedious devotion to one subject of limited extent from which such discoveries have usually resulted; and the fact may be, in some measure, the result of our social habits and ideas." He asserts further on "that with all our social drawbacks we have contributed our fair share to the progress of natural, as well as of physical, mathematical, and other sciences. We have had our Robert Brown, our John Ray, and lastly, with such names as Linnæus and Darwin, the northern nations can well hold their own in the presence of any scientific celebrities of Central Europe."

"One instance of the backwardness on our part to which I have alluded is afforded in the investigation of the progress of growth, and especially of the first formation and early development of the organised individual, which, under the new lights thrown upon the subject by the Darwinian theories, have been shown to have so important a bearing on difficult questions in animal and vegetable physiology and affinities." "We should keep in mind a perceptible difference between our two great scientific neighbours, the French and Germans. Excelling in method, the French are unrivalled in clearness of exposition in Natural Histroy as in other subjects. On the other hand, method and exposition are not among the distinguishing characteristics of German naturalists; but they are beyond all compe-

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tition in laborious and patient investigation of details, upon which all reliable conclusions must be founded. To them we practically owe the greater number of important compilations, genera and species, nomenclature and indexes requiring steady labour, with results not brilliant but useful. Again, if the French are good theorists, the Germans are great speculators. If French theories may sometimes be found defective in detail, so German imagination is apt to wander too far from the facts with which it started. And this comparison of French method and German detail, of French theory and German speculation, will be probably found exemplified not only in their physiological researches and elementary works, but also in their monographs and other systematic publications. You learn more rapidly from a Frenchman; the German supplies you with more materials for study; and thus you derive equal benefit from both."

While I quite agree generally in the truth of the above remarks, I would ask whether this especial attention to minute details, for which the Germans have so high a reputation, is not often attended with certain inconveniences—whether the habit of dwelling on slight distinctions is not apt to give them in the student's mind a higher degree of importance than they really deserve, and whether it does not lead to the evil results which I am about to bring before you?

A second supplement to Herr Fückel's Symbolæ Mycologiæ has just appeared. In his introduction, the author says that one great object he had in view in his earlier work was to present to the reader every fact which seemed of interest, and especially anything which appeared new as regards the limitation of genera and species. He says that he has followed generally the principles of Tulasne and De Bary, using them, however, in subordination to his own judgment; thus, for instance, he declines to follow De Bary with regard to the Myxomycetes, considering them as a transition from animals to vegetables. Speaking of his own new genera, he acknowledges that his characters are very often slight and insufficient; but he alleges, in excuse, the imperfection of our knowledge of the various phases of fruit-formation in such genus or species. He considers, notwithstanding, that the only way to avoid grouping together heterogenous species is to constitute new genera. The question here arises—To what length is this to be carried? for it may be extended so far as to create a new genus for each individual, inasmuch as two distinct species always differ in some material point from each other, and it remains for an author to use his judgment as to what differences should be considered of generic value. A genus, unlike a species, is merely an arbitrary distinction, made for the convenience of the student, and the question is whether the great multiplication of genera does not rather tend to confuse the science than to render it easier or more comprehensible. Since writing the above, an excellent *resumé* of Fückel's classification of Sphœriaeci, by Mr. Plowright, has appeared in the September number of "Grevillea," in which, I think, the reviewer coincides in a great measure with what I

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would now remark. Alluding to the genus Peziza as hitherto constituted, Herr Fückel asks, "Is it possible that Peziza onotica and Peziza atrata can properly belong to the same genus?" I would ask, in reply, Whether the potato and the nightshade ought to remain in one genus? Surely they differ quite as much from one another as the two pezizæ alluded to even if their higher position in the vegetable world be taken into the account. There is as good reason, proceeds the author, for the division of the genus peziza as there is for that of sphœria, as in the latter there is an endless variety in the perithecia so is there in the cups of the former. Fückel lays great weight on the differences of the sporidia, and thinks that eventually no fungi whose spores differ materially in the most highly developed form of their fruit can be suffered to remain the same genus, although we may be as yet far removed from a knowledge of their various phases sufficient to assign them their full characters. Notwithstanding this dogma he leaves the genus ascobulus entire, disregarding the vast differences in their sporidia, an omission which has been happily remedied by Mon. Boudier, in his excellent monograph of that genus. To give an instance of Herr Fuckel's new genera, the plant published in his fungi rhenani as peziza lichenicala he has removed in his symbolæ into a new genus called ahlesia, the only grounds for this are its having asci at first stuffed with minute granules, afterwards containing 16 spores. The first-named peculiarity is, I believe, common to many ascigerous fungi in an early state, and the latter character is found also in the genus ascobolus. Fückel describes, I think, 28 new genera of pezizei, three of which contain only a single species, eight contain two species each, others 3, 4, and 5 species, an amount of subdivision, generally on very slight grounds, tending much to increase the difficulties of the study. The differences of these new genera are so obscure as to have escaped the keen eye of Fries; but to take an instance. The genus plicaris Fückel is described as having asci covered with oblique transverse folds, a character which I have been quite unable to perceive; he includes in this genus the following pezizæ: P. carbonaria, P. postulata, P. badia, P. cerea, P. repanda, P. reticulata, and P. trachycarpa Currey. I have with me a mounted specimen of the last named species, so that persons can observe for themselves if such a character be discernible; if a ¼-inch object-glass will not show it, surely a beginner must be sorely puzzled where to place the pezizæ just alluded to. Fückel seems to think that as the sphœriæ have been distributed in different genera, partly from the differences of their perithecia, so may the pezizæ from those of their cups: but later writers, as Winter and Fückel himself, are obliged to abandon many of their new genera of speœriæ, which, when more maturely considered, are found to be untenable. De Notaris, Cesati, Nitschke and Niessl, Bonorda and Corda, have created genera without end thus multiplying synonyms and adding to the confusion of the subject. Herr Winter has made some useful remarks on the sphæriacous genus sordaria to which I would call attention as confirmatory of my view of the useless multi-

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plication of genera. "Cesati and De Notaris," says Winter, "distinguish the genus sordaria from rossellini chiefly by the nature of its perithecium, which is said to be crassiuscula in sordaria, and subcrustacea vel lignescertia in rossellinia; but these writers include a number of species in sordaria whose perithecia are clearly woody in texture, or even of a carbonaceous nature (1), while Auerswald brings together a number of things under sordaria which have nothing in common with it except the form and colour of the sporidia; some of these belong to rossellinia, others to anthostoma, others again to amphisphœria, and lastly some to arnium Nitschke. Fückel, on the other hand, limits his genus sordaria to the single species S. coprophila, bringing the other nearly allied forms under other genera whose species inhabit dung, or, in one case, the lees of wine; he grounds his genera on the presence or absence of a stroma, on the appendages of the sporidia, the hairyness of the perithecia, and on the mode of germination of the sporidia. In the first supplement to his Beiträge, Fückel nevertheless describes a true sordaria growing on wood, while it is hinted that the genera cercophora and malinvernia cannot be retained; lastly in his second supplement, Fückel abandons these genera, uniting them with sordaria." Winter promises to show that Fükel's malinvernia breviseta is identical with cercophora conica Fückel, or is at most only a varity of that species. Winter says he has traced the growth of the sporidia in malivernia breviseta, sordaria coprophila, and cercophora fimiseda, and can confirm Fückel's later views, viz., that these three species must be re-united into one, and that De Bary indirectly corroborates this opinion as he has named a certain species cerophora fimiseda, which he (Winter) finds on examination to coincide with cerophora conica in every respect. Again, from a careful study of specimens, Winter asserts that cercophora mirabilis Fückel and sordaria corprophila ces and De Not are quite identical, and that the first must therefore be brought under sordaria coprophila as a synonym. In a like way Winter reduces his own sordaria setosa to a form of S. coprophila, and further reduces the new genera coprolepa and hypocopra to sordaria; these two genera were separated by Fückel on account of the presence of a stroma in the former, but the term "stroma" Winter says requires a more accurate definition than it has had yet. In some species of diaporthe Nitschke a stroma is mentioned, of which not even a black boundary line is perceptible. Now this can scarcely be what is usually implied by that term. In fact, the division of sphœriœ into "simplices" and "compositœ" cannot be strictly interpreted, and that certain genera combine both characters; what becomes then of the genera coprolepa and hypocopra if the presence of a stroma is the only or main difference between them? Winter would reduce the two to sordaria; in hypocopra the sporidia are clothed with a gelatinous envelope, but are without appendages; in sordaria the reverse is the case, and he argues that the envelope and the appendages are physiologically equivalent and

(1) Commentario della Societa crittogamica Italica, 1863, p. 225.

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would therefore reduce hypocopra to sordaria. Other genera of the pyrenomycetes possess similar appendages as diaporthe Nitschke melanconis (Tul.), lophiostoma (Fr)., but in these genera some species possess them while others do not; even in the same species they are sometimes present sometimes not, as in lophiostoma canlima. Again in rosellinia, R. niessli (Auers.) the sporidia have gelatinous sheaths, and so have those of R. liguiaria, whilst in R. thelena they have appendages at each end. Following out these observations, Winter unites the genera coprolifia, hypocopra, malinvernia, cercophora, and sordaria into one, and would leave the old and generally acknowledged sordaria as a representative of them all. It is the opinion of my friend, Mr. Currey, that these appendages are only the commencement of germination. In this I cannot myself concur. I think that the threads produced by the germination of fungus-spores are less regular in form and length than these appendages, and that the appendages being present in a very early stage of the spores militates against my friend's view. To this he, however, replies that he has observed fungus spores germinating long before they were mature. I think my friend is almost alone in his view. Neither Tulasne, nor Berkeley, nor Cooke, seem to regard the appendages in his view, nor does Winter appear to do so judging by the paper I have been discussing. Should Mr. Currey's view be the true one it will of course upset all characters derived from the presence or absence of appendages, as well as their equivalence to the gelatinous envelopes of other species. I may here mention that I believe the sporidia sphœria ovina and S. bombarda are changed as they become mature from a simple linear form to one furnished with an ovate head. At first they become from linear slightly clavate, the clavate end gradually swelling out into an ovate head, and lastly it seemed to me that the linear or tail-like part was absorbed, or dropped off, leaving the sporidia of a simple ovate form. These observations require confirmation, by tracing a single group of the sphœria through its entire course, which I have been hitherto unable to accomplish. But to return to Herr Winter. In his recent paper (Bot Zeit, 1873, p. 65), he reduces various new species to older forms, as sordaria fimicola (Ces. and De Not) is made to comprehend S. Conferta (Anersd.), S. fimeti and equina (Fückel), and he says that probably Hypocopra stercoraria Fückel (Sphœria Low) is identical with Sporormia intermedia Auers. Thus there seems to be a very pretty entanglement for a young student to unravel, all which arises from a too hasty nomenclature founded on transient or insufficient characters. Mr. Plowright remarks (grevillea l.c.) that Xylaria pedunculata Fr. is not classed with the fimicoli, although it is, as Mr. Berkeley long since intimated, closely allied to, or identical with, Spœria stercoraria Low. Talasne ("Carpologia," vol. p.), represents this species in various stages of development, and I have myself traced it from a mere thin stroma, in which the perithecia lay embedded, to its most perfect Xylaria form. Talasne in his "Carpologia" has, in vain it appears, warned those botanists who devote their time to tracing out the phases of fruit-formation in fungi against a too

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hasty decision of what constitutes a species, or to what more perfect form any given lower form may pertain, and the neglect of his advice has led to the creation of numerous genera and species which are now exercising the ingenuity of other botanists to restore to their proper place. Specimens of peziza reticula mounted shows the sporidia germinating, which may be compared with the appendages in sphœria thelenase.

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THE FUNGI OF GERARDE'S HERBAL.

By E. C. PLOWRIGHT, Esq.

Few circumstances tend more to enhance the interest we take in any study than our coming across some allusion to it in the writings of antiquity. Whether this arises from the idea of other persons drawing enjoyment from the same source as ourselves, or from the fact that a long genealogy commands respect, it is not for me to say. To the casual observer the connexion existing between history and botany would appear as remote as it was possible to imagine two things to be, and that the history of botany *per se* could consist of but little else than a chronicle of strange names, or, at most, that might be curious to know into what errors our forefathers fell. Such, for example, as the miraculous vegetable origin of the barnacle goose.

A moment's reflection, however, will suffice to convince us that we are indebted to history to an incalculable extent. When any fresh botanical fact is discovered, unless it is duly chronicled and made a matter of history, it obviously dies with the discoverer, and, as far as he is concerned, for ever lost to the world.

The ground work of botany, and indeed of every other science, consists of an agregation of individual experiences. From time to time some master mind arises which has the power and the will to systematize these, and of deducing certain generalizations from them; thus reducing to order what before was chaos.

It forms no part of my intention this evening to go into the history of mycology, although such a procedure would be fraught with interest, but simply to enumerate the fungi figured in one of the very early books on botany that was printed in our own land. By title, at least, Gerarde's Herbal is familiar to all of us.

John Gerarde was a master of the Chirurgians Company, who in the year 1597 published the first edition of the Herbal which bears his name. This work if said to be in great part, at least, a translation from from the Latin of a previous work by Dodonæus; although the arrangement of the material it contains is different, being that employed by the great Lobel. But more than this, there seems great reason to doubt whether even this translation was executed by Gerarde, he having been accused of employing without acknowledgment the manuscript of one made by a Dr. Priest. Leaving all these considerations on one side, we know that in the course of thirty-six years a second and much larger edition was produced under the auspices of Mr. William Johnson. This ponderous folio volume contains an

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enumeration of some 2,850 plants, and is embellished by 2,700 wood engravings, which latter were obtained from the Continent, having previously done duty in the works of Dodonæus, Lobel, and Clasius. It is to this edition I would direct your attention. The editor, however, cannot be complimented either upon his acquaintance with fungology, nor upon his good services in advancing his study; indeed, rather he seems to have done all that lay in his power to deter students from entering upon this field of inquiry. It is, however, interesting to see what species were mentioned in an English work of such an early date. Although the most of them are totally devoid of any intelligible description, yet we are able to recognise a few readily enough by the figures that are given. The first fungus of which mention is made can scarcely be credited to the knowledge of the times. Chapter 57 is devoted to "Burnt Corne," and narrates the ravages of Tilletia caries amongst barley, oats, and rye, commencing in the following words: "Hordeum ustum or Ustilago hordei is that burnt and blasted barley which is altogether unprofitable and good for nothing else, an enemy unto corne, for that instead of an ear with corne there is nothing but black dust which spoileth bread and whatsoever is made thereof." It is accompanied by three engravings of blighted ears of the before-mentioned plants.

The 167th chapter of the 3rd Book is especially devoted to mushrooms or toadstools, and opens with these portentous words :—

"Many wantons that dwell near the sea, and have fish at will, are very desirous for change of diet to feed upon the birds of the mountains, and such as dwell upon the hill or champion grounds do long after sea-fish. Many that have plenty of both do hunger after the earthly excrescences called mushrooms, whereof some are very venomous and full of poison; others not so noisome, and neither of them very wholesome meat."

The four figures representing "common mushrooms to be eaten" are none of such a character as to admit of recognition without an element of doubt. The third may, however, be Agaricus nebularis, and indeed is not very unlike Grevilles plate. No. 9 of Agaricus turgidus. No. 2 is obviously a Clavaria possibly C. botrytis. No. 4 seems to include more than one species of agaric, and if we might venture a guess, perhaps the artist has attempted the delineation of Hygrophorus pratensis. Of figures 5 and 6 I have nothing to say.

Figure 7, which is the representation of Fungus sambucinum sive auricula judæ, is a very fair representation of the Jewe's-ears. Indeed Gerarde seems to value these more than any of the others on account of their medicinal value, "they being used against inflammation and other soreness of the throat, being boiled in milk." We certainly have never seen them used ourselves in such cases, but it does not seem irrational to suppose that the gelatinous principle of which they are composed might have an emollient action when applied topically to an inflamed throat. Coming now to the poisonous fungi, fig. viii. represents some Pholiotta, most probably Ag. Muscarius, but by far the

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most unmistakable delineation of whole series is the next, viz., that of Clathrus cancellatus. "Fungus Faviginosus (Morchella Esculenta) needs no description, although we should not have looked for it among the poisonous fungi. Neither does our old friend Phallus impudicus, although the editor has done his best to puzzle us by printing the figures upside down. The chapter ends with a representation of a group of half-dozen "Tuber Terræ," but beyond these being subterranean fungi it is difficult to say whether the author intends them to represent edible or poisonous species. They appear to be truffles, but there is a slight resemblance to Sowerby's t 310 of Tuber album. They are, however, of exotic origin, and are reported to be very baneful in dry and gravelly grounds in Pannonia, where the inhabitants are constrained to dig them up and cast them about as we do molehills. Gerarde remarks that poisonous mushrooms grow where old rusty iron lieth, or rotten clouts, or near to serpent's dens, or the roots of trees that bring forth venomous fruit. In bringing my uninteresting paper to a close, I cannot do better than quote the translation of the lines from Horace given by our author at the close of his remarks on the habitats of fungi—

> The meadow mushrooms are in kind the best,
> It is ill trusting any of the rest

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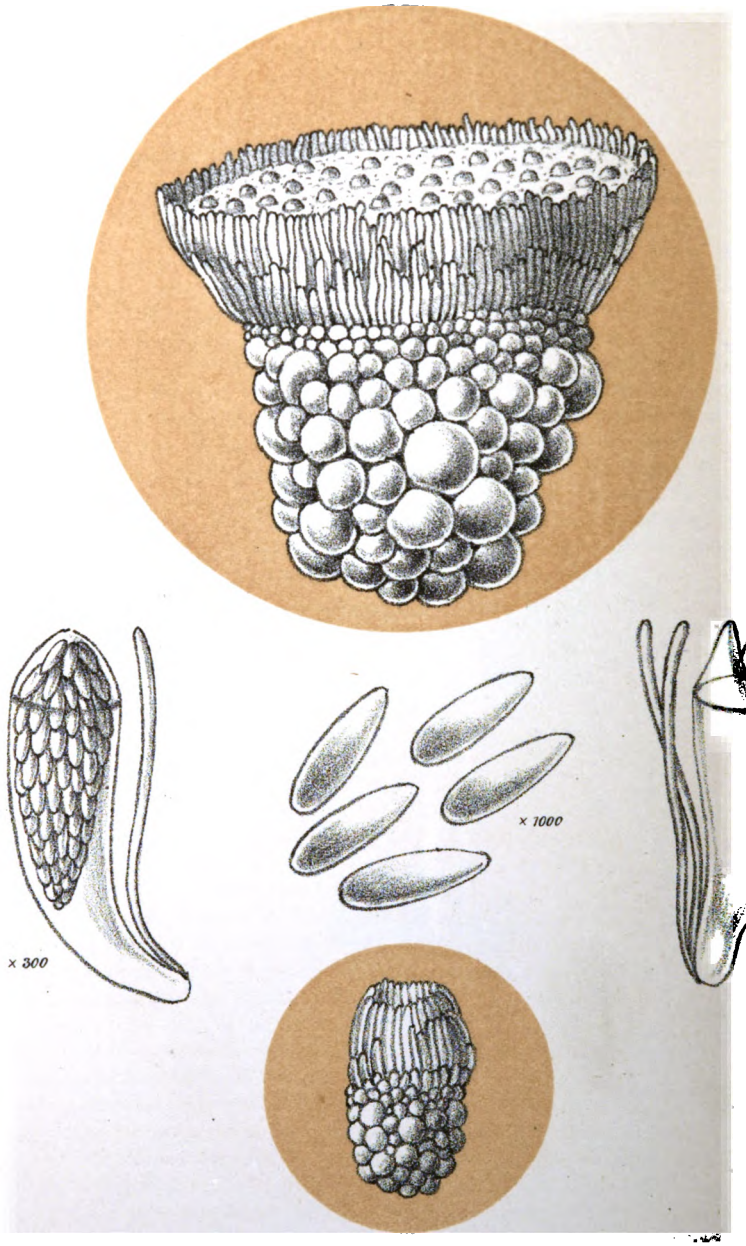

J. Renny. del. W. G. Smith. lith.

Vincent Brooks Day & Son Imp.

Ascobolus (Ascozonus) Woohopensis B & Br.

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NEW SPECIES OF THE GENUS *ASCOBOLUS*.

By JAMES RENNY.

In M. Boudier's well-laboured and elegant monograph* of the genus *Ascobolus*, or rather the genera which he collects together in his family *Ascobolei*, he objects to associate with these genera any Pezizæform fungus which does not embody three characteristics—prominence of ascus, dehiscence of the ascus by an operculum, and absence of nucleus and granulation in the spores. Many of the other *Helvellacei* have one or two of these characters, but in the *Ascobolei* alone, according to M. Boudier's definition of the group, are the whole three united. This definition consequently compels him to exclude from his lists of species a minute cup-shaped fungus with aspect and habit remarkably similar to the prominent species of his genus *Ryparobius*, and like them endowed with many-spored asci. He relegates this plant, which he fully describes under the name of *Peziza cunicularia*, to the vast genus *Peziza*. He concludes his description, however, by saying that he does not doubt it will constitute a new genus, along with the plant described by the MM. Crouan, when these *Discomycetes* shall have been more thoroughly studied. M. Crouan's fungus is presumedly the same as M. Boudier's, or a sister form, and, as well as a similar growth found by M. Leveillé, accords with the verbal description given by M. Boudier of his *Peziza cunicularia*.

I have found many specimens of this minute and interesting growth within the last few years. My principal gatherings have been made in Herefordshire, but I have rarely failed to find it whenever or wherever I have looked for it in a suitable locality. I have met with many varieties. Some differ but little from a normal form, others present variations of sufficient importance to constitute in my view specific distinctions, although all my plants will bear out the characters given by M. Boudier with but trifling alterations. As these salient varieties now number at least six, the time has perhaps arrived, foreshadowed by M. Boudier, when a new genus or a new section may be formed to contain them.

Has, then, this small group of *Discomycetes* strong affinities either to *Peziza* or *Ascobolus*, in which case it would be well to make them a section of one of these genera, or are they, as M. Broudier holds, so distinct (from *Ascobolus* at least) as to require for their nomenclature the proposal of a new genus? Mr. Cooke, it may be remarked, in his "Handbook of British Fungi," follows only partially M. Boudier's plan. As I understand M. Boudier, he makes use of five generic names, and not of five sections of the genus *Ascobolus*. Such a division of this genus in

* Ann. des Sc. Nat. ser. 5, tom. x., p. 191. (See also Journ. Bot., 1870, p. 40.)

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sections, under M. Boudier's generic names (omitting *Ryparobius* and *Theothecus* not then found in England), Mr. Cooke adopts, and he precedes it with Mr. Berkeley's old definition of *Ascobolus*, in which "Asci exploded," is the important character. I presume, therefore, that he found M. Boudier's arrangement unmanageable, if not based upon artificial rather than natural distinctions.

The marked characteristic of the funguses it is my object to describe, is the possession of a strongly-defined ring near the summit of the ascus, formed at an early stage of life by a thickening within of the external wall. This ring is in no way connected with the subsequent dehiscence of the ascus. It does not contract, or dry up, or split so as to constitute the portion of the ascus above it a large operculum. It rather acts at last in opposition to such a manner of rending. Dehiscence takes place transversely to the plane of this ring, and forms a bilabiate above it and down to it. For this reason M. Boudier excludes from his *Ascobolei* a growth which in all other respects, by aspect, by contour, by habitat, by growth, and by enumeration of parts, is one with the leading forms of *Ryparobius*, and in my view can hardly be separated far from them without neglecting the principles of natural arrangement. I prefer, therefore, to think of the plants I describe rather as a section of *Ascobolus*, which I would mainly found upon "exploding asci," than as constituting with reason a new genus. The ripe asci are in general strongly prominent, as much so as in *Saccobolus* and *Ascophanus*. I have often found empty cups by no means in a condition of extreme decay, which seemed to me only to be accounted for by a power of ejecting asci. I do not think it would be advisable to admit into *Peziza* or *Helotium*, which have only an eight-spored ascus, species having multisporous asci. I propose then to form a sixth section of *Ascobolus* under the title of *Ascozonus*.

The formation of the zonal stripe upon the ascus of these *Ascoboli*, a point which distinguishes them so definitely from the members of all other sections, can be well made out. I have been able in more than one of my species to trace its creation quite satisfactorily. In the earliest condition of the ascus, up to about half-growth, the contents are nearly uniform, or present only faint spherical outlines of various sizes sparsely and irregularly placed within the uniformly thin walls. At this time the contents begin to differentiate. Large globular granulations collect along and about the axis of the ascus, surrounded by a homogeneous stratum which extends to the general wall. This central granular mass pushes out near its tip horizontally a lens-shaped extension till it touches the wall near the widest part. Here for a while it seems to solder to the wall, spreading slightly above and below the first fine circular line of contact. At this line a thickening now takes place upon the wall, and is soon seen to have a semicircular section projecting inwards. The central globules now contract, the lentiform portion quits the wall, and leaves the thickened line as a ring. They soon redissolve, and the tolerably uniform mass presently begins to differentiate anew into spores, which enlarge, thicken in sub-

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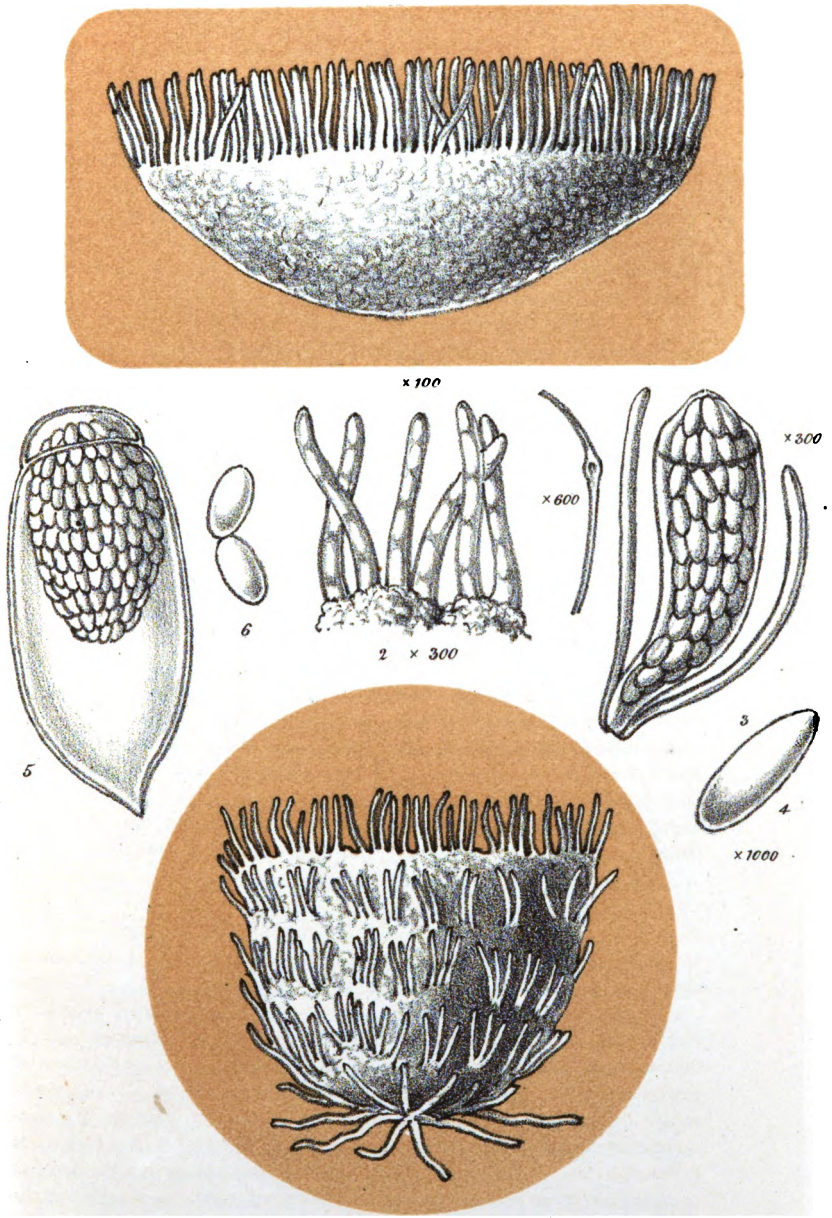

J. Renny del. W. G. Smith, lith. Vincent Brooks Day & Son Imp.

1.2.3.4. Ascobolus (Ascozonus) cunicularius. Renny.
4.5 6.7. Ascobolus (Ascozonus) subhirta. Renny.

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stance, acquire a visible epispore, and float in a thin liquid. In several species they generally aggregate into a compact ovate mass, rising towards the upper part of the ascus. Meanwhile the outermost homogeneous stratum thins away till the ascus is seen to be filled only with the fluid in which the aggregated spores are floating. I am not aware of any physiological reason for the lentiform protraction, which thus causes the zonal thickening, but it has been more or less completely observed in every species described. The figures have been drawn from *A. Woolhopensis* in which the changes are well marked.

The plants are for the most part exceedingly small, rarely exceeding 1.50 in diameter. They have usually a silvery whiteness and purity very attractive under the microscope. The number of spores within an ascus is generally 64, but the difficulty of counting them is great and rarely allows the exact number to be made out. Thirty-two are less frequently met with. They vary, however, from 16 to 128 or more. The spore-number seems constant in the same species, and thus constitutes a good specific quality. The walls of the cup are usually thick, that is, composed of several layers of cells. In one species, however, the cup is formed of a single stratum. The cells vary much in size; *A. Woolhopensis* being very large and bladdery. The fringe of hairs on the margin of the cups varies in length and in evenness. The asci are usually curved and never cylindrical. They dehisce, as I have said, by a rent which commences at the tip extending straight down on two sides to the ring. The two valves thus formed are usually well parted. Paraphyses are very rarely met with. Asci seem to be exploded very frequently, if not as a rule. The older the cups the fewer asci are to be met with, and cups entirely empty and but slightly discoloured are often seen.

The Ascozoni are found on the dung of rabbits and hares, birds and mice. At most seasons of the year they may be met with but chiefly in winter. That this season should exhibit them in greater abundance is frobably to be ascribed to the greater dampness then prevalent, which allows of growth uninterrupted by draught.

ASCOZONUS. *Renny. Ascobolus, Pers* (sect. nova).

Cupulæ minutissimæ, lucenter hyalinæ, hemisphericæ et sessiles, aut subconicæ et stipitatæ, glabræ aut in una specie subhirtæ, ad marginem pilis plerumque uniseriatis coronatæ, stercoricolæ. Discus planus aut convexus, ascis prominentibus papillatus. Asci ampli, curvati, clavati aut oblongo-ovati, sporas 16 ad 128 aut etiam plures includentes, annulo subcrasso conspicuo versum apicem cincti, fissura verticali bilabiata dehiscentes. Paraphyses innumerosæ, interdum furcatæ. Sporæ numerosæ, oblong-fusiformes, intus egranulosæ, episporio hyalino glabro inclusæ, ad maturitatem asci extremitatem versus in massam ovatam imbricatam plerumque aggregatæ.

A. Cunicularius, *Renny. Peziza cunicularia*, Boudier, Ann. des Sc. Nat. v. ser., tom. x., p. 258. *Ascobolus Leveillei*, Crouan, Flore de Fin., p. 57, suppl. f. 1 (in parte). *Ryparobius argenteus*, B. & Br., Ann. Nat. Hist. iv. ser., vol. xi. p. 347.

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Minutissimus, sessilis, glaber, argenteus, pilis uniseriatis æqualibus mollibus ciliatus; cellulæ exteriores cupulæ nec bullatæ, pæne plane; sporæ 64.

Cups 1-50—1-100 in. wide adhering to a few fine filaments, sessile, smooth, of a silvery whiteness, bearing a single even row of sub-cylindric smooth hairs not septate but cellulose about $\frac{1}{3}$ of the total height. Asci curved, not so broad as in some other species. Paraphyses few, rather enlarged towards the tip: Mr. Berkeley found them forked. Spores 64. Towards maturity the originally hemispherical cups flatten not inconsiderably. [Tab. 155, fig. 1-4.]

A. Woolhopensis, *Renny*. *Ryparobius Woolhopensis*, B. and Br., Cum. Nat. Hist. iv. ser., vol. xi., p. 347. Minutus, primum candidus dein albidus; cupulæ basi substipitiformæ incrassatæ, inferne tuberculatæ, sursum pilis mollibus partim biseriatis coronatæ; sporæ 64.

Cups 1-40 and 1-60 in. wide and high. Spores normally 64 fusiform 0007 × 0003. Minute, scattered, at first white, then dingy with a thick stem-like base which is studded with large uneven semi-globular wart-like cells fringed with unequal close-set or over-lapping hairs which seem here and there to form a double row arising from the much smaller rounded even cells which form the margin.

On birds' dung. Winter. Hereford. [Tab. 153.]

A. Leveillei, *Renny*. Minutissimus, stipitatus, clare albus. Stipes de cellulis bullatis formatus, cupulam obconicam cellulis externe subplanis conditam inferens; asci ampli prominentes bene annulati; sporæ 64 ad 96, oblongo-fusiformes, in massam imbricatam ad asci extremitatem aggregatæ.

Very minute 1-80—1-120 in. wide and high, stipitate, silvery white. Stem formed of rounded prominent cells, the body of the cup of smaller much flattened cells. Marginal hairs in a thin single row short and irregular. Disc rough with the prominent asci which are very broad, tapering below, with strongly marked rings. The spores are more numerous than in *A. Woolhopensis*, amounting probably to 96, and their collected mass is more compact and imbricate. The finer proportions and the thinness of the row of hairs seem also to distinguish it from that species, while the spore number distinguishes it from *A. parvisporus*.

On rabbits' dung. Winter. Hereford. [Tab. 154, fig. 1-5.]

A. Crouani, *Renny*.—Minutissimus, primum candidus dein, albidus, fragilis, sessilis, hemisphericus, glaber, substantia laterum strato cellularum unico formata, ad marginem pilis uniseriatis curtis asprellis subacuminatis ciliatus; sporæ 32.

Cups 1-150 rarely 1-100 in., formed of a single layer of subcubical cells, with a single row of sharp, pointed hairs often roughened on their sides about one-sixth to one-eighth of the whole height. Disc plane, granulate. Asci narrower than usual. Spores normally 32, oblongo-fusiform. To be distinguished from *A. cunicularius* by the shorter and tapering rough cilia as well as by the thinness and transparency of the walls.

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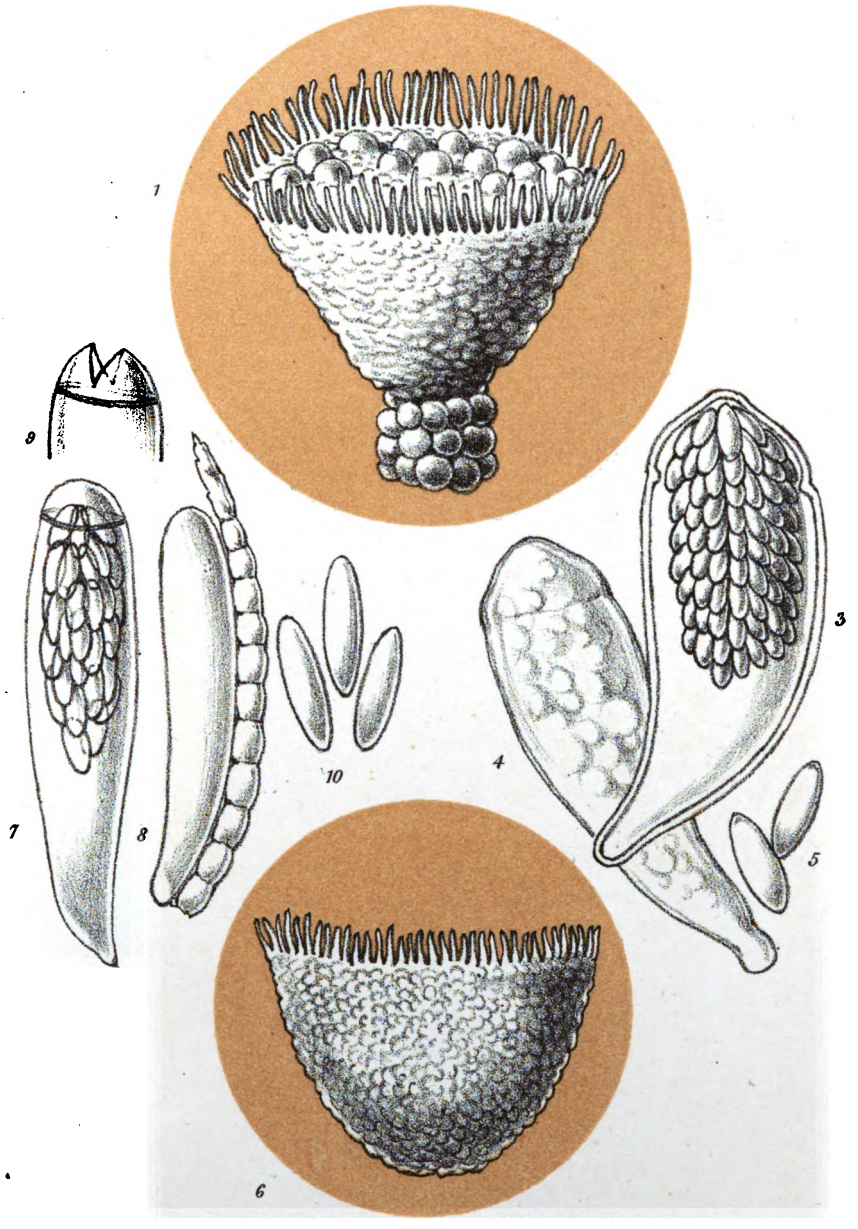

J. Renny, del. W.G. Smith, lith.

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1–5. Ascobolus (Ascozonus) Leveillei. Renny.
6–10. Ascobolus (Ascozonus) Crouani. Renny.

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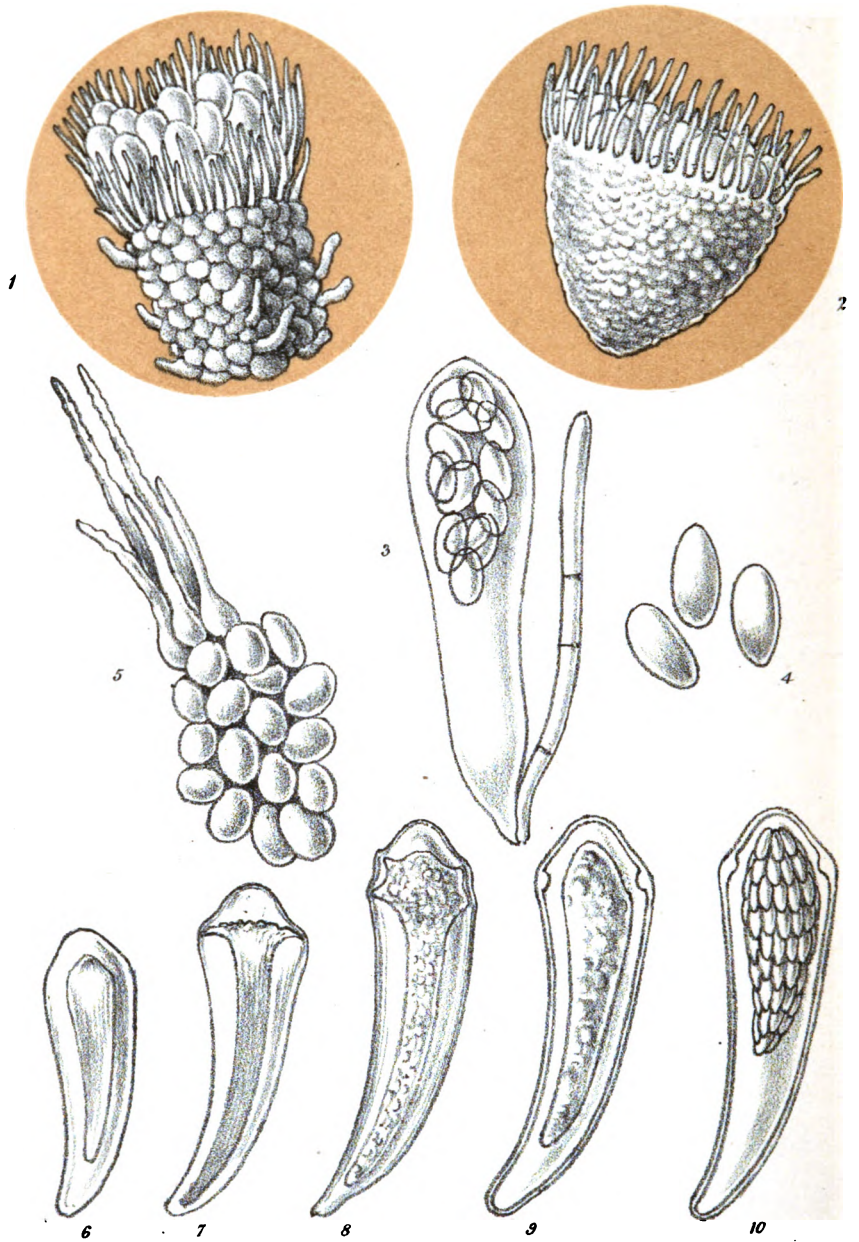

J. Renny del. W. G. Smith. lith.

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1-5. Ascobolus (Ascozonus) parvispora. Renny.

6-10. Development of the Asceus & Sporidia in Ascobolus

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On rabbits' dung. Autumn. Hereford. [Tab. 154, fig. 6-10.]

A. PARVISPORUS, *Renny*.—Minutissimus, fragilis, sed carnosior quam alteris-primum totus albus, dein subvinose tinctus, subcylindricus aut obconicus, externe bullatus et interdum celluloso-penicelliatus, pilis inæqualibus asprellis ad marginem ciliatus. Sporæ regulatim 16, interdum plures usque ad 24, fusiformes, sed nec tam oblongæ quam in alteris speciebus.

Very minute, though fragile, somewhat more fleshy than other species. White and brilliant at first, then duller with a faintly vinous tinge. Substance formed of bladdery polygonal cells, unequal in size and often projecting in hair-like threads, such as are frequently seen in *Peziza granulata*. Margin unevenly fringed with somewhat roughened subulate hairs, often in a partly double row. Disc flat at first, then filled with the prominent broad slightly clavate 16-spored asci. Spores normally 16? More have been found, but the number is very inconstant; probably 24 is nearly as frequent as 16. They are not closely aggregated or regularly imbricated in the upper part of the ascus.

On rabbits' dung. Autumn. Hereford. [Tab. 156. fig. 1-5*.]

A. SUBHIRTUS, *Renny*.—Minutus, clare hyalinus sessilis hemisphericus pilis curtis inæqualibus 2 vel 3 connatis huc et illuc subhirtus corona pilorum curtorum inæqualium ad marginem investitus. Sporæ 128? nec minus.

Minute, but larger than most of species; 1-40—1-50 in., pure white, nearly transparent, sessile hemispherical, dotted with short, unequal hairs, mostly connate in pairs or threes besides the unevenly ciliated margin. Disc flat, coarsely papillate. Asci very wide (·0035 × ·0015) subovate, somewhat constricted at the strongly-marked ring which is near the flattened tip. Spores very numerous, not less than 128, collected finally into a dense, regularly imbricated, ovoid mass in the upper part of the ascus.

On rabbits' dung. Autumn. Hereford. [Tab. 155, fig. 4-7.]

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* The engraver has omitted to mark the ascus with its inseparable ring.

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The Woolhope Naturalists' Field Club.

ANNUAL MEETING,

MARCH 2ND, 1874.

The Field Club held its annual meeting at the Green Dragon Hotel, Hereford, on Monday, March 2nd, at two p.m., when the following gentlemen were present:—Rev. James Davies (President) in the chair; W. A. Swinburne, Esq., Rev. R. H. Williams (1873), Arthur Armitage, Esq., and Rev. C. J. Robinson (1874), Vice-Presidents; Thomas Cam, Esq., Timothy Curley, Esq., and J. Griffiths Morris, Esq. (Member of the Central Committee), James Rankin, Esq., and F. Edmunds, Esq. (Members of the Editorial Committee), B. Haigh Allen, Esq., Dr. Bull, Rev. F. T. Havergal, Rev. H. Cooper Key, Rev. W. Jones Thomas, Rev. J. H. Jukes, Rev. F. Merewether, Rev. Thomas Phillipps, Rev. T. T. Smith, W. H. West, Esq., Mr. Theos. Lane, and Mr. Arthur Thompson, Treasurer and Assistant Secretary.

The Treasurer's statement of accounts for the past year was read and adopted, showing a balance in favour of the club of £65 11s. 1d.

A letter was read from John Lloyd, Esq., promising "The Register of the flood water of the Wye."

It was resolved "That Mr. Thompson do write to Mr. Isbell and ask him to kindly favour the Club with 'The Meteorological Report for 1873,' for publication in the forthcoming volume of the club transactions."

The following times and places were fixed for the field meetings for the

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present year:—Friday, May 15, Church Stretton; Friday, June 19th, Builth; Friday, July 17, the Ladies' Day at Doward's Cave; Tuesday, August 18th, Lydney. The usual Fungus Foray to take place on Thursday, September 24th.

Rev. R. H. Cobbold, Rector of Ross; Mr. Theos. Lane, Hereford; and Mr. Edward Cambridge Phillips, Solicitor, Brecon, were elected annual members, and several other gentlemen were proposed for election at the next meeting.

Evan Pateshall, Esq., M.P., was unable at the last moment to attend, owing to indisposition.

A paper was read by Mr. RANKIN on "British Rodents."

Proposed by the PRESIDENT, seconded by Mr. CAM, and carried, "That the thanks of the meeting be given to Mr. Rankin for his paper, and that it be printed in the transactions of the club."

The dinner was served at four o'clock, when the High Sheriff (Lieut.-Colonel Symonds) and Mr. Reginald Symonds joined the company.

After dinner the PRESIDENT proposed the health of the Queen, and this toast having been received with the wonted loyalty of Woolhopians, proceeded to deliver his retiring address, which occupied some forty minutes.

At the conclusion of the address Mr. FLAVELL EDMUNDS rose to corroborate that portion of it which, *ápropos* of Wapley, Croft Ambrey, and the Herefordshire and Radnorshire Camps, declined to see in any of them the requirements of Tacitus's account of the last battle of Caractacus. Mr. Edmunds pointed out that the Breidden Hill, near the Severn in Montgomeryshire, was the only hill hitherto named which fulfilled the conditions of the annalist's description.

The HIGH SHERIFF then proposed the health of the President, with a vote of thanks to him for his retiring address, and congratulated the club on the fact that a retiring address did not in this case imply retirement, the President having been re-elected. He expressed his willingness to serve on a pomological sub-committee to facilitate the interchange of grafts and scions of choice apples and pears between members of the club; and adverting to the third meeting of the coming year, which had been fixed for the Doward Caves on the 17th of July, suggested that the archæologists of the club should turn aside on that occasion to inspect the old Herefordshire manor-house at Gillow, and also a camp on his (Colonel Symonds's) property, which he would be happy to show them.

Dr. BULL, in seconding the vote of thanks to the President, took occasion to refer to a botanical paper on the flora of the district about Moor Court, written by his eldest son, Mr. James Henry Davies, as an able and interesting paper, and congratulated the President on his son's having obtained the distinction of a first-class in Natural Science Honours at Oxford at the final examination last term. He trusted that at many future field meetings the club would have Mr. J. H. Davies among them. Dr. Bull

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further presented a paper containing a list of the fungi found during the Hereford forays of October, 1873, and, remarking on what the President had said in his address of the success of these forays, took occasion to say that the season was decidedly unfavourable for mycological discoveries, owing to its lateness and the very low temperature, but the success of the meeting, as *graphically* illustrated, had been "stunning."

After the PRESIDENT had returned thanks for the compliment paid to himself and his son,

The Rev. W. JONES THOMAS addressed the club upon the importance, with a view to a collected flora of the county and its districts, of parochial floras made by resident botanists, such records to be treasured up, and (as we understood him) kept as carefully as the registers of the parish. Mr. Thomas further pleaded for more attention to the somewhat neglected art of flower painting, and its application to the permanent recording of the wild flowers of a parish or district.

The Rev. T. T. SMITH agreed with Mr. Thomas, and considered that this kind and manner of record was in many respects preferable to the plan of preserving dried specimens.

Mr. RANKIN then made some remarks on the meteorology of the year, and the great value of the meteorological tables with which Mr. Isbell had been wont from year to year to enhance the value of the club's transactions. In the course of his observations Mr. Rankin quoted an opinion that the mean temperature of 1873 was higher than usual.

Dr. BULL controverted that opinion, and adduced authorities and arguments in support of his view.

Mr. RANKIN observed that, as a rule, the temperature was apt to be lower than elsewhere in Herefordshire.

In the course of the evening Mr. HAVERGAL, at the request of the President, gave some account of the completion of the Mappa Mundi *fac similes*, and of the elucidatory essay on mediæval geography by Messrs. Bevan and Phillot. He recalled the recollection of the club to the fact that this truly Herefordshire work had been undertaken at the instance of the Woolhope Club at one of the annual meetings. As yet he regretted to say that public libraries and institutions had not subscribed for these works with anything like alacrity, though, they were full of interest, and by no means so dry as might be expected from the nature of the subject. Turning to some remarks which had fallen from Mr. Davies in his address about the long-deferred prospect of a complete county history. Mr. Havergal dwelt at some length on the extreme value of the storehouse of ancient deeds, records, and papers in the hands of the Dean and Chapter of Hereford. At present these were a sealed book to the archæologist and the antiquary, although at the archæological meeting at Hereford four or five years back, a few of these treasures, which he had then been permitted to exhibit to one of the meetings, had been pronounced to be of the highest value and interest.

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Mr. FLAVELL EDMUNDS confirmed Mr. Havergal's reminiscences of the meeting in question, and recalled the high opinion of the veteran antiquary, Mr. Black, of those precious documents. The matter of some of them was of singular interest. In one case he remembered Mr. Black had read to them the terms of a permission granted by the Pope to Edward I., to break his contract of marriage with a Herefordshire lady, in order that he might marry a lady of Royal birth (a laugh), and there were many others of equal interest in other respects.

After some remarks by Mr. Robinson, Mr. Havergal, and the President, touching the possibility of respectfully approaching the Dean and Chapter with a view to access to these records, the difficulties in the way of proper securities for their taking no hurt, and the necessity of the privilege of access being limited, in any case, to a few duly qualified persons; and after a few words from the President in corroboration of Mr. Havergal's statement that the essay in elucidation of the Mappa Mundi was by no means dry or uninteresting, the annual meeting broke up, after a very pleasant evening.

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ADDRESS OF THE RETIRING PRESIDENT,

(REV. JAMES DAVIES)

GENTLEMEN OF THE WOOLHOPE CLUB,—The time has arrived when, according to custom, your President should make his bow, and deliver his retiring address, and I will not disguise from you that a whisper of a lazy spirit has suggested to me that (inasmuch as your undeserved kindness wills that I should hold office for another year), I might postpone a retiring address until an actual retirement. But second and better thoughts have counselled me that to do so would be to prove myself unworthy of your confidence; and that it is my duty, after the custom of my predecessors in this chair, to review our last year's work, and to venture on suggestions and speculations as regards that which we are commencing. Yet when I remember the masterly grasp displayed by Dr. Steele a year ago of all the subjects within the cognizance of the Woolhope Club, I cannot help feeling the inadequacy of my own superficial acquaintance with them to furnish more than a perfunctory survey, or to enhance the collective credit of the Society of which we are members. Under these circumstances it is a relief to know that my duty is to "speak right on," and so I will begin by reminding you that, with the exception of the appointment of an Editorial Committee to provide for the due publication of our Annual Transactions, our first notable work in the year 1873 was the visit of the Club to Wapley Camp, a locality in which every genuine Herefordshire man has a vested interest, but of the antecedents of which, as of many other of our Camps, most Herefordshire men have been singularly incurious. For years it passed in local estimation for a Roman Camp, and I am not sure that its recent proprietor, the late Lady Langdale, ever quite forgave me for acting as guide in 1863 to those Cambrian Archæologists who decided (beyond doubt soundly), from its formation and features, that it was a British. It was peculiarly seasonable to revert, as we did, to the question last May, for whereas our visit on the 15th of that month led to a further examination of the connection of this Camp with the struggles and standpoints of Caractacus in his gallant retreat before the Roman general and his legions. In the

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following August the Cambrian Archæologists, assembled at the Knighton Congress, took up the ball, which we had already thrown down, and contributed somewhat—perhaps it is not for me to say how much—towards gathering up the threads of the campaign, and deciding, if not where Caractacus's last battle *was* fought, at least where it *was not* fought. During the week at Knighton I had an opportunity of inspecting most of the Radnorshire strongholds, which local patriotism associate with the Silurian hero; but, whilst I think there is every probability that *Wapley* and *Croft Ambrey* were both entrenched camps held and lost by the retreating Caractacus, I cannot suppress a conviction—to which I gave expression at the end of last August in a review article—that his last battle was fought not near the Lugg nor near the Teme, but across the border between the Silures and Ordovices, in North Wales, and in the neighbourhood of the Severn. An entrenched camp on an eminence, washed at the base by the Dee, which at times overflows its banks and realises Tacitus's description—a camp just opposite Corwen in North Wales—though that is too far away for the scene of action—fulfils to my fancy more requirements of the annalist's description than any camp in Herefordshire or Radnorshire. The Wapley meeting was numerously attended; and the day of it fine. Your President's fear lest he should be suspected of tempting the Club into "fresh fields and pastures new," and seducing them from geology and natural history into archæology was dissipated, when, after lunch, at Moor Court, a paper by Mr. James Henry Davies, on "The Botany of the District," was read by Dr. Bull, and proved the signal for a discussion of kindred topics, in which Mr. Jones Thomas, Mr. Lloyd, and Mr. Middleton (an accomplished naturalist, who, I regret to say, has made too brief a sojourn in our county), as well as others, took a part. Mr. J. H. Davies's paper, brief and fragmentary then, owing to the pressure of reading for natural science honours, has, since his degree, been so enlarged and supplemented, as to evince, I hope, not only his familiarity, but his sympathy, with one of the most delightful pursuits of our Club. I cannot quit the remembrance of the Club's visit to Moor Court without an expression of personal satisfaction that so goodly a number of members were there to see and examine the wych elm, the silver fir, and the elm avenue, which, in the transactions of 1869, the Woolhope Commissioner has commemorated in his "Notes on Herefordshire Trees." Our second field meeting, on Friday, June 13, was for May Hill and Ross. Unkindly and lowering weather kept away many Woolhopians from the enjoyment of a good out-look, and a rare geological treat. The reward of braving weather and ascending the hill is an unrivalled panoramic view of the Vales of Gloucester, Tewkesbury, Berkeley, of the Hills of Monmouthshire and South Wales, of the Bristol Channel, the Severn and the Wye, as well as a survey of ground most interesting to the geologist, as representing the group of beds which Murchison designated the "Upper Llandovery Rocks." A sufficient number of members faced the weather, which was after

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all merciful enough to allow them full compensation for a toilsome march in a splendid glimpse of Gloucester Cathedral. At the conclusion of Mr. Symonds's address on the hill top, the rain burst its barriers, and poured down with a vehemence that did not abate for the rest of our available day. Of Mr. Symonds's address, I can only speak in the capacity of a novice scanning the mature wisdom of a veteran. You will be able to judge of it by perusal in our transactions; but I may be allowed to express the gratification it gave the Club and its President on the day in question to welcome, when they were well up the hill-side, the cheery presence of the author of "Old Stones," and to find "The Recorder of the Rocks," undaunted by wind or weather, at the rendezvous before them, and ready, as soon as a ring was formed, to pour forth his stores of information, about the history, antiquities, folklore, and geology of a height so familiar to most of us from a distance, but by most of us so rarely (if ever) before surmounted. Nor were we indebted to Mr. Symonds for his lecture alone. In reply to a vote of thanks, he let fall some suggestive remarks on the importance of making the new museum—the inauguration of which promises to be one of the local events of a year which has begun eventfully—a repertory and sanctuary of the typical fossils of the district within range of the Woolhope Club, as well as of such kindred local collections as should be offered by individuals, and accounted worthy, by a competent committee, of such a permanent hope. Remembering the great boon of the Ludlow Museum as a nurse of local geologists, and calling to mind the interest of the museums, public and private, at Shrewsbury, Malvern, Salisbury, Caerleon, and elsewhere, it seems to me not unseasonable to express a hope that Hereford, slow though it has been to build itself a house, and concentrate its forces in a local habitation, will make up for lost time in the systematic accumulation of treasures from its many special fields, and will take steps (for this I hold to be a most important matter) to furnish itself with a scientific library of reference. At Ross, where we dined on the May Hill field day, stress of weather prevented the attendance of some who would either have read independent papers or supplemented that which we had heard in the morning. I think I may now confidently state that the topic, which was mainly discussed after dinner, namely, the revived publication of the Club's transactions, has since acquired form and substance, and is likely to bear fruit not later than Midsummer, in a volume which will embrace all our unpublished arrear of matter. I must only ask the Club to have patience, and to grant us, if we need it, a very small rate in aid. Our third excursion (on the Ladies' Day, July the 11th), was to Richard's Castle and Hay Park, the former an historic site of an importance in the history of the Marches, very disproportionate to its now scarcely visible vestiges; the latter dear to poetic fancy (which I hope the Woolhope Club does not ban or banish) as the scene of Lady Alice Egerton's misadventure, which eventuated in Milton's "Masque of Comus." Through the generous hospitality of Mr. Broadwood, the tenant of the Moor and Hay Parks, who met us at Richard's Castle, and

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acted as our guide and host throughout the day, we ran a risk of forgetting our scientific vocation, and of indulging our collective genius rather on the good things of the table. Yet I was able to procure an audience for Mr. Theophilus Salwey's paper on the topography and geology of the locality, as well as, somewhat later, for a communication from the Rev. C. H. Middleton, of Lingen, touching the botany and ornithology of the Deerfold district. The hours spent in reconnoitring the "Comus dingle" will not easily be forgotten; nor yet the woodland drive of half-a-mile out of the Hay Park *en route* for Ludlow, which, flanked on either side by a dense array of foxgloves in full bloom, created the impression as of a fairy glen. Those who desired it had the chance of tracing, on this field day, the Comus Legend from its origin to its denouement, for the Castle of Ludlow and its banquet hall were on the day's programme. Your President attributes his failure of accompanying the section of Woolhopians who visited these to the seductive hospitality of the good folk of Ludlow, which he had realised long before that day, both as a schoolboy and a schoolmaster. One practical outcome of this meeting was the shaping of a proposal of the Rev. R. H. Williams, that the Club should offer annual prizes for specimen collection of dried plants, insects, &c., made in the course of each year in any parish connected with the club. This proposal was first broached at the Hay Park, further ventilated at Brecon, and on the day of our fungus feast definitively accepted. I hope we shall be able to announce the terms of it in our transactions. Our excursion to Brecon and its neighbourhood on Tuesday, August 26, came off under difficulties. At the Hay Park meeting, a sub-committee connected with the neighbourhood undertook to communicate with the President on the feasibility of ascending the Brecon Beacon, and some correspondence passed on the subject. But before the issue of any programme, it had been made clear to the committee that any such idea must be abandoned, as neither trains nor day time would allow of its accomplishment consistently with a return home at night. I had, at the first meeting of the year, proposed Lydney for this day's excursion, and foreseen the difficulties in the way of an ascent of the Beacon. A more modest excursion was eventually substituted; and the programme issued was limited to an exploration of the Crûg, a hill retaining some vestiges of a British camp, and an inspection of the Priory Church and the College at Brecon. When the day arrived, a murky morning affirmed the wisdom of our low-pitched projects; and at Brecon station even these bade fair to fail through the absence of our secretary, detained, it appeared subsequently, at Sheffield by an accident. No carriages were in attendance; no dinner had been ordered; but, driven to our resources, a party of some 25 determined to make the best of the situation, and, being fortunate in the guidance of Mr. Thomas, a Breconian of long standing and brother of two of our most esteemed members, ascended the Crûg, examined its still visible entrenchments, and besides enjoying a fine survey of the Brecknockshire mountains, was able to see at no great distance the site of the old Roman

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station of Bannuir, or "Caer Bannau," and realize the truth, that when there is a British camp, a Roman camp is not far off. On the Crûg, I can hardly say "weather permitting," Dr. Chapman read an entomological paper on the beetle called "Geotrupas Stercorarius and its Parasites;" after which, taking another route past an ancient well towards the Priory, under umbrellas, we were conducted over that stately and venerable fabric, now in course of restoration from designs by Sir Gibert Scott, by its present vicar, the Rev. Herbert Williams. I am sorry that no ecclesiologist amongst us extemporised a discourse on the architecture of this remarkable structure, which is held to be in no part, of earlier date than the 13th centnry, either on the spot or after dinner at the Castle. Perhaps, if, as many members seemed to wish, we were to make Brecon the centre of another excursion, we might count upon a paper from Mr. Herbert Williams, who was unable to dine with us that evening owing to a recent domestic affliction. Our after-dinner space was devoted to Rev. C. J. Robinson's paper on the Domesday Book in Herefordshire, of which interesting essay readers will find a transcript in the Transactions. If the day was against us and in some circumstances untoward, still I am persuaded that no Woolhopian out on it would have any inclination to vote against a second visit, arising from unpleasant reminiscences. But such a revisiting must be planned for us by experienced local members; though I cannot doubt that, had our first visit included the Beacon, it would have left us bitterer reminiscences than we realized in carrying our our limited programme. Coming now to the Fungus Foray, which, through Dr. Bull's arrangements and exertions was spread over the fourth week in October, it needs but that I should remind you of its success, both in point of mycological guests of more or less note, and in respect of the country they visited, and the treasures they discovered. The Mynde, Bryngwyn, Dinedor, Holme Lacy, and Moccas yielded, to larger or smaller bands of lynx-eyed fungus-seekers, discoveries which they knew how to appreciate, though the outer world is sceptical of their social and botanical importance—discoveries, some of which will, I am happy to say, find pictorial commemoration in the forthcoming volume. The presence amongst us of the veteran Berkeley, to say nothing of such names as Broome, Rennie, Houghton, Worthington, Smith, forbade the possibility of an unfruitful quest; and though I believe that more than once the starts from Hereford amidst clouds and rain were watched by outsiders, who inwardly deemed that the break's destination ought to have been a certain imposing building at Burghill, certainly no one who joined any one of these excursions will henceforth aver our forays are fruitless, any more than that they are unsociable, unentertaining, or uninstructive. I do not insist, though convinced myself, that every camp-follower need accept as a test of membership a devout belief in the importance of esculent fungi to the food supply of the future, nor am I hardy enough to maintain that our feasts would be as well frequented were they strictly limited to vegetable sweetbreads, beefsteaks, and oysters; but surely when our International Exhibitions, Schools of Cookery, and kindred institutions are trying

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to popularize the culinary art, and make the English housewife as deft at making the most of the food within her reach as her continental sisters, it is no work of supererogation to teach the distinctions between edible and inedible fungi, and the uses which the former may serve as component parts of an appetising dish. So much in humble discipleship to our good friend Dr. Bull, to whom also "You and I and all of us" owe so much for the zeal, liberality, and self-sacrifising good-nature with which he contrived to render pleasant the sojourn of our guests, who would carry away a no less grateful remembrance of the private *soirées* of their friends in Hereford than of the hospitality afforded by the various country seats which came within the range of their excursion. One subject mooted in the post-prandial speeches of our fungus feast I reserve for convenience to a later point, and I need not refer to the various able papers read on that occasion, because they will be found in our records; but I have not noticed in the reports of the meeting any reference to a subject mooted at a *soirée* at Mr. Cam's, where we were fortunate enough to end the foray and feast day of October 23rd. I mean Mr. Machen Jones's urgent plea for a fixed standard of pronunciation and quantity as applied to mycological words derived from the Greek or Latin. No doubt the great latitude which botanists at present indulge in this respect is often a great trial to critical ears; and it would not be amiss if some competent Woolhopian would undertake a portable and handy "Gradus ad mycologiam;" but it must be remembered, in mitigation, that some words borrowed from other languages, and mispronounced by us, in point of quantity (take, for instance, balcony, which ought to be pronounced balcŏny), have taken authority for mispronunciation by long use; and that the practical mischief of pronouncing "entoloma" "entolŏma," or vice versâ, is not likely to be widely disastrous. Dipping lately into the "Anglo-Latin Satirical Poetry of the 12th Century," I found two elegiac lines in a complimentary epistle of Nigel Wireker, a writer studied by Chaucer, to his patron, William Longchamp, which may be quoted as early authority for latitudinarianism in this matter. De Longchamp was about to quit ecclesiastical preferment in Poitou for England, where he became Bishop of Ely, and the poet suggests to him that he should aim at nothing less that the Archbishopric of Canterbury. This is the couplet to which I refer:—

> Anglorum sedem puiman pete, sive Britŏnum;
> Si Britŏnum mavis dicere, nemo victat.

And it may be rendered freely:—

> To be Primate among the Britŏnes expect;
> If you'd rather say Britŏnes, I don't object.

Laxity of quantity could hardly have more rope than this. But—to be serious—the greater concern for practical fungolists is to popularise their discoveries—to coin an intelligible and vernacular nomenclature; and to effect

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this without disturbing the classical and more learned vocabulary of the sciences, which requires cherishing as a medium of international communication. If he had leisure, who so fit for the task of simplification as Dr. Bull? And now to turn to a few remarks and suggestions springing out of the foregoing survey of 1873, I will crave your patience just a little longer. Our brief taste of archæology at Wapley ought, I think, to spur those membere of the Club, whose proclivities are rather antiquarian than scientific, to cater for our transactions much more of the kindred food, which in this border county lies so ready to hand. Not only are there many camps still unexplored, many dykes still to be traced and investigated, but the whole field, which we reckon ourselves specially privileged to traverse, is rich in historical remains and memorials, from before the Norman Conquest until past the Parliamentarian struggle. With many of these the pleasant, popular, and (not the less on that account) erudite volumes anent our "Castles and Manor Houses," by the Rev. C. J. Robinson, have made us more familiar; and with the connection of Herefordshire with the struggle betwixt Charles I. and his Parliament, some of you have become better acquainted by the able editing of "The Military Memoir of Colonel Birch" for the Camden Society, by the late Rev. John Webb. It is simple justice to say of that work, completed and carried through the press by a son who inherits his sire's accuracy, acumen, and devotion to literature that its notes are worth at least ten times the value of the memoir; and that on the strength of these annotations it is a volume no Herefordshire library ought to be without. Nor can it be out of place to add here that the Rev. T. W. Webb proposes shortly to publish another and larger work of his late father, entitled, "Memoirs of the Civil War between Charles I. and his Parliament," particularly as it affected the county of Hereford. Judging from the interest of the opening chapter, which I have had the privilege of perusing in MSS., I cannot doubt the acquisition which the proposed volumes will prove to the curious in Herefordshire history. Do we sufficiently encourage those who strive to illustrate and unearth our annals? I fear not, if one is to judge by Mr. Hull's first list of subscribers! But perhaps many are taking time to consider; and such, too, may be the explanation of the tardiness of members of the Woolhope Club, to enliven our meetings and enrich our volumes by papers illustrative of such features of Herefordshire history, or antiquities, as have come within their ken. I have mentioned a member and non-member who are honourable exceptions to the general rule of consigning our traditions to Lethe. Let me not forget, at the present time, to express the debt of those who are proud of our old memorials to our brother Woolhopian, Mr. Phillott, for his share in elucidating our Cathedral "Mappa Mundi," which was first fac-similed through the instigation of our Club. It was wont to be said that Herefordshire was the Bœotia of England: a hard saying, never, I believe, quite true—but now, if we husband and utilise the talent and intellectual strength which new blood, it may be, had raised among us—evinced by such works as the "Castles and Mansions,"

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the "Military Memoir," "The Essay on Medieval Geography," and, let me add, "The Fast Herefordenses"—there can be no reason why, in due time, under the stimulus and encouragement of our Club in some measure, such a complete history of Herefordshire should not be forthcoming as would atone for the tantalising fragmentariness of vexatious Duncombe. As *nuclei* of such an "Opus Magnum" *imposse*, our Club may well invite the observations and contributions of all members whose taste and researches take this direction. Aught that arises out of our visit to May Hill has been already anticipated, unless it be the hint that heights near to hand, if yet unexplored by us, offer a more fruitful and remunerative field than distant hills which take half a day to reach. But out of our third meeting, and Mr. Middleton's letter about the fauna and flora of Deerfold, I think there have arisen one or two little signs of independent activity, which seem to affirm our *raison d'etre* as a Club. It is reasonable to suppose that there are not a few retired naturalists within our area, or on its confines, whom our example stimulates into action. Mr. Middleton did not belong to us, but he had not lived two or three years at Lingen without noting down the birds and plants of that somewhat inaccessible district. Since the appearance of his letter in the *Hereford Times* account of our Hay Park meeting, I have noticed, as no doubt many others of you have, two separate lists of local flora, evincing much observation and scrutiny of nature's works, in the same columns, and each of these ascribing its communication to the example set from Lingen. The one was from Rhayader; the other from Orleton, near Leominster and Ludlow. I think it is well worth considering the suggestion of the writer of the latter letter, that our Club should pay Orleton a visit; and though I am unacquainted personally with the Rhayader botanist, I think I could find means of communicating with him, and showing him that our Club reciprocates his interest in our pursuits; and that if we should find it feasible to make an excursion to the neighbourhood of Rhayader he might be persuaded to sketch us a programme, and perhaps assist us in making such a far field-meeting worth the trouble. It is by combination after all, rather than isolated work, that advances are permanently made in any science or investigation; and it is conceivable that there are those not of us, but around us and about us, whose quiet pains and congenial inquiries might take an impetus from the tender of our right hand of fellowship. But lately you have seen another short botanical paper in the *Hereford Times*. Can we not bring our botanists together, and get them to divide the field for reaping? At least they might combine in appealing to Mr. Purchas to complete his Flora. In the meanwhile, I need scarcely say how much of interest for the lover of nature in general, and if I may judge by myself, for the average literary man, there is in the simplest records of the natural history of any parish or country nook. It were trite to name "White's Natural History of Selborne," or "Stanley's Birds"—but I would ask you whether you doubt that numbers of boys,

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dull at the classics and dull at the mathematics, have not found an aim, and perhaps a name, by the direction of their minds to the pursuits to which such volumes lead up; and that a great help to such minds is furnished by the work of field clubs, both a field and in papers. Of instructive monographs (if I may so speak), I have not for a long time met with a more interesting sample than Mr. J. Trahern Moggridge's "Harvesting Ants and Trap-door Spiders: with notes and observations on their habits and dwellings," published last year by T. Reeve and Co., London; a book containing the minutest records of insect ingenuity and insect architecture, and carrying the reader on from page to page with much of the zest and fascination of a romance, though it is but the record of strange truths. The book came into my hands from another source, but in the course of it I found that the author's aide-de-camp in his most interesting researches was Mr. Robert Lightbody, the younger, an example of the value and efficiency of an intelligent direction, and of an

Indoles
Nutrita faustis sub penetralibus.

And this leads me to think again of Dr. Chapman's short entomological paper, the only one of that branch during the year, and to plead with our entomologists for more results of their addiction. In the book to which I have referred they should find an incitement to kindred achievements; and I am persuaded that there are few studies which offer so fine a field of achievement to patient observation and a plain unvarnished detail—for Mr. Moggridge depends for his charm far more on this than on any trick of style or composition. Perhaps for the furtherance of entomological study—I speak as a mere novice—there needs a large amount of microscopic work, an habituation with the details and niceties of microscopy. If so, here is a section of our field in which we may post up a hand-bill, "Wanted, labourers!" And I don't think we shall want long. The names of Mr. Cooper Key, Mr. With, and Mr. Smith, of Thruxton, would go far to the making of an able microscopical sub-committee, and I have reason to believe that they will not reject our appeal, if we ask them to constitute one, *with power to add to their numbers.* I have but one more topic on which to touch. At our Fungus Feast a suggestion was offered as to an interchange of grafts of choice apples and pears through the medium of the Woolhope Club, and an effort to bestow a portion of the interest which our society devotes to forest trees, upon the fruit-bearers for which Herefordshire in past time has been so deservedly famous. You will recollect that Mr. Berkeley, as Chairman of the Fruit Committee at South Kensington, gave us warm encouragement as well as the promise of countenance and assistance. There are, and must be, not a few of our members who are practised apple and pear growers and fanciers, and—as we have in these days almost forgotten "protection," and set up "free trade" in its place—it is probable that such, if invited, would be willing both to communicate their experiences as to successful grafting and budding, and to co-operate in any interchange

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of scions or grafts. There is room among us for successors of Lord Scudamore, and of Thomas Andrew Knight in improved pomology, and, though for myself all that I know of selection of scions, of increase to the size of fruit by approach grafting, and of like matters, is mere book-learning gotten from the cheap Manual of "Charles Baltet," the French Pomologist, I have no doubt that a Pomological Sub-Committee would set the wheel in motion for us, and report progress—at any rate during the ensuing year. That there is room for immediate improvement everywhere in this country I cannot doubt after a letter which I very lately received from a practical market-gardener near Town, who is besides the best translator I know of Virgil's Georgics [and a novelist in whom you all take delight, or I am very much mistaken]. "As to things pomological," he writes, "there can be little doubt that the great advances of the last twenty years is little known in the provinces. Many know nothing of the various new pears now well at home in England. Their beau ideal was Marie Louise, or Gansel's Bergamot, or even Jargonelle, good pears all, but quite outdone by Beurrè Superfine, Beurre Hardy, and above all, by Dozenne du Comice. And for late pears, Josephine de Malines, beats the old Winter Nelis, Easter Beurre, Beurrè Rance, &c., out of all comparison. Knight's Monarch is first-rate: nothing can beat it when at its best; but in some years it does not come to perfection, whereas Dozenne de Comia has never failed. No pear is without a fault. Marie Louise is a delicious pear, but too sweet, too apt to bear at the tips of the branches, or, worse still, most tender in the blossom. The only defect I have yet discovered in the Dezenne du Comia is, that it inclines to fruit less freely every other year. It is better from a standard than a wall; as nearly all pears are, but very late ones. The violent changes of temperature (to which the face of a wall is subject far more than the full wind) are apt to impair the fine blossom of the fruit." So far my correspondent. I will but add that at the meeting where this topic was first broached, our now High Sheriff, Colonel Symonds, volunteered his co-operation; and I think we might count on that of Mr. Tweed of Bridstow—both of whom are experienced amateur fruit-growers. We owe it to those who come after us to maintain and strengthen our title to the garden of England. As to park and forest trees, we shall assert our claim to consideration in respect of them, in a number of illustrations to the forthcoming volume. It remains only for me, gentlemen, as you have willed that I should retain office for another year, to ask you of your kindness to co-operate with me in making the coming twelve months as practical as the last has been pleasant. If personal presence and interest in your meetings can counterbalance slender acquaintance with the branches of science which our Club most affects, you may freely count upon this much from me. And I will add this also, that, under my presidency, there shall be no encouragement to exalt Nature to a pedestal above Nature's God; for if there is one paramount gain in the scrutiny of Nature's marvels, I hold that it consists

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in the constraint put upon our abased intellects to acknowledge, in them all, the proofs of a beneficent Providence and an infinite Divine Intelligence.

O marvellous credulty of man !
If God indeed kept secret, couldst thou know,
Or follow up the mighty Artizan,
Unless he willed it so ?
And canst thou of the Maker think in sooth
That of the made He shall be found at fault,
And dream of wresting from Him hidden truth
By force or by assault ?
But if he keeps not secret—if thine eyes
He openeth to His wondrous work of late—
Think how in soberness thy wisdom lies,
And have the grace to wait.
Wait, not against the half learn'd lesson fret,
Nor chide at old belief, as if it err'd ;
Because thou can't not reconcile as yet
The Worker and the Word.—*(Jean Ingelow.)*

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BRITISH RODENTS.

By JAMES RANKIN, Esq.

GENTLEMEN—The following paper on British Rodents is intended to some extent to be a companion paper to those which I have already read to this Society on British Cheiroptera and British Insectivora.

The Order of Mammals, which is called Rodentia, consists for the most part of small animals, and its chief and leading characteristic, by which it may at once be distinguished from every other Order of Mammals, is the possession of two prominent incisor teeth in both upper and lower jaws, and by the absence of canine teeth.

The molar teeth, or grinders, are generally few in number, rarely more than four in each jaw, and fitted for the purpose of grinding and triturating a vegetable diet.

The external form of many of the animals comprised in this order resembles very much that of those in the order of Insectivora, as, for example, the mouse and the shrew, the porcupine and the hedgehog, and others, the former of each of these two examples being in the Order Rodentia, and the latter in the Order Insectivora. It is only nececessary, however, to examine the dentition of these animals, and it will at once be seen how entirely dissimilar must be their mode of life and kind of food, the Insectivora being provided with numerous sharp-pointed teeth intended for devouring insects, and the Rodentia having teeth intended for a vegetable diet.

The Order Rodentia, therefore, comprises only vegetable feeders, if we except some instances of the carnivorous propensities of the rat; and, like most other vegetable feeders, they are not a bold or pugnacious order of animals, but trust for their safety chiefly to flight. Although mostly small animals, they are very swift of foot and possess great muscular power.

Most of the order, like the rabbit, rat, mouse, and others, live in holes burrowed in the ground; and some, like the beaver, make very perfect and complex dwellings; some animals in the order, however, like the hare, seem to have lost the instinct of burrowing.

All the animals comprised in this order are clothed with soft fur, with the exception of the porcupines, which are provided with horny quills over a great portion of the body. In the case of some of the foreign members of this order, as, for example, the chinchillas, the fur is of considerable value.

The viscera and muscular system of the Rodentia present upon the whole

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nothing very remarkable or dissimilar to the arrangement found in other orders. As vegetable feeders the intestines are long, but the stomach is simple and unlike the Ruminantia.

The bony skeleton is light, and suited to the great activity displayed by this order of Mammals, and in nearly all the members of the order the hind limbs are very much longer than the fore, and this is especially observable in those animals like the jerboas, which proceed by a series of leaps. In them the metatarsal bones are very much elongated and coalesce into one, giving almost the appearance of the leg of a bird. The most important peculiarity of structure, however, in this order, consists in the incisor teeth. These, as I have already mentioned, are always two in number in both jaws, and are seated in very deep sockets. The outer surface of the teeth is covered by a very hard enamel, and the body of the teeth is formed of a hard dentine, this latter substance being, however, much less hard than the enamel; also, the enamel on the outside of the incisor teeth is considerably harder than that on the inside. The result of this formation is that by the continual gnawing at hard substances like wood, nuts, &c., the softer parts of the tooth are worn away more quickly than the harder, and the outside enamel becomes sharpened into the form of a chisel, admirably adapted for cutting into hard surfaces. As by the constant trituration in biting the incisor teeth would soon become worn away, if not renewed, there is at the base of these teeth which I have already said is deep in the jaw, provision for a constant renewal or growth of the tooth, so that as the tooth is constantly worn away at the point it is as constantly added to at the base. It sometimes happens that from the loss of one of the upper or lower teeth the opposing tooth grows to a great length, and continues its direction of growth in the same arc of a circle as it exists in the jaw, and the result is that the animal is quite unable to open its mouth wide enough to use the tooth and so sometimes dies of starvation. The molar teeth are usually few in number and separated from the two incisors by a considerable gap. The jaws are so attached to the skull as to allow of very ample lateral movement. In the genera Lepus (hares and rabbits), and Cavia (guinea pigs), the clavicles are only imperfectly developed. In all the other British genera belonging to this order the clavicles are well developed, and in nearly every species considerable rotatory motion is permitted to the fore limbs which are extensively used as instruments for grasping. I pass on now to notice the formation of the brain in this order. This organ in the order Rodentia presents an intermediate appearance between the brains of the non-placental animals (Marsupials and Monotremes), which are usually placed by zoologists below them, and the higher orders such as Carnivora, Ruminantia, and Quadrumana. In the order Rodentia, and the same remarks apply pretty generally to the three orders, Bruta, Cheiroptera, and Insectivora, the cerebral lobes are nearly quite smooth, and not traversed as in other animals by furrows; their extent is greater than in the Marsupials and Monotremes, but they

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still do not cover either the olfactory lobes in front, or the cerebellum behind. The corpus collosum or cerebral commissure is present in the brains of this order. The foregoing peculiarities, and especially the smooth surface of the cerebral lobes, have induced Professor Owen to make a sub-class of the four orders, Bruta, Cheiroptera, Insectivora and Rodentia, under the name of Lissencephala, or Smooth-brains. Although there exists without doubt a great deal of similarity between the brains of these four orders of Mammalia, yet as many other distinctions are found between them, as well as a considerable diversity in the formation of their brains, Professor Owen's classification is not generally followed. At the same time, however, it is universally admitted that the four orders, Bruta or Sloths, Cheiroptera or Bats, Insectivora Shrews, Mole, &c., and Rodentia, Rats, Rabbits, &c., are closely allied together in a classificatory point of view. The foregoing account of the brain of Rodentia will point to a somewhat low amount of intelligence among these animals; we find, however, that in some instances their social instincts (as in the beaver) rise to a great perfection. Like most small Mammals the Rodentia have a wide geographical distribution, and are exceedingly prolific. Some members of the order are found in nearly every known part of the globe, and several species have an immense range. Thus the brown or common rat has dispersed itself with man, over the whole of the inhabited portion of the world; it is believed to have come originally from the East. The common mouse is also found almost everywhere that the human race have settled. The Beaver has a range over the northern parts of Europe, Asia, and America, and was once an inhabitant of this country. The Musk Rat is a native of Northern America; The Beaver Rat, or Hydromye, of Van Dieman's Land. The Porcupine inhabits Southern Europe, Africa, and India. The Urson, which is an animal much resembling the Sloths, is a native of Canada, and lives upon the trees. South America is also represented by the Guinea pig, the Capybara, the Agouti, and the Chinchilla; Africa by the Gerboas, or leaping Hares.

I will pass on now from this brief notice of the distribution of this order to notice shortly the British species of the order. The followlng may be regarded as natives of this country :—

Brown Rat—Musdecŭmānus.
Black Rat—Mus rattus.
Common Mouse—Mus musculus.
Harvest Mouse—Mus sylvaticus.
Water Vole—Arvicola amphibius.
Campagnol—Arvicola arvalis.
Hare—Lepus timidus.
Rabbit—Lepus cuniculus.
Dormouse—Myoxus avellanarius
Spuirrel—Sciurus Europœus, and
Formerly the Beaver—Castor fiber.

The common, or brown rat, is an animal too well known to need minute description, and its dental formula is similar to that found throughout the order. It is supposed to have been imported into this country not much more than a century ago, but it is so fierce and so prolific that it has

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nearly exterminated the old English, or Black Rat, and has overspread the whole country. It is one of the few instances in the order of carnivorous tastes, and indeed the rat may be called an omnivorous animal, as nothing seems to come amiss to it. Some rats, called Sewer Rats, from their ordinary place of habitation, are much larger and fiercer, and have a violent appetite for blood; and when in numbers have been known to attack a man with fatal results. They also frequently devour one another, and as it is an acknowledged fact that the number of male rats is much greater than the number of females, it has been supposed that owing to the greater tenderness and delicacy of the female flesh, and also perhaps to their being the weaker vessels, they are more often devoured than the males. Rats are said to produce three broods in a year, and to bring forth from 8 to 14 at a brood, and to begin to breed at 4 months, so that they are immensely prolific. The female rat is a good mother, and will defend her offspring against any attack, and especially against the visits of their paternal parent, who, when he comes to see his offspring, usually wants to eat them. The brown Rat is a quick and clever animal, and endowed with acute perceptive faculties, and has been frequently tamed and taught tricks. There are several instances of the foresight and intelligence of rats, and there is a saying that rats will always desert a falling or burning house shortly before the event.

Black Rat.—The Black Rat is so called from the darker hue of its fur. It is very similar in general appearance to the brown rat, but rather smaller, and its ears and tail are proportionally longer. The upper jaw also projects over the lower. The Black Rat exists in the temperate regions of Europe and Asia. It has been nearly exterminated, however, in many places by the larger and fiercer Brown Rat.

Common Mouse.—This well-known little animal has something of the appearance of a rat in miniature. It belongs to the same genus, and often has the same habitat. It is a purely vegetable feeder, and closely follows upon the steps of man. It is easily tamed, and the variegated specimens are pretty little creatures. It is, like the rat, very prolific. There are several well authenticated records of mice giving forth musical sounds, but opinions differ as to the originating cause of these sounds. Some suppose them to be the result of a bronchial disease, and others that they are learned by the mice by their power of imitation. The sounds when produced are a kind of chirping whistle.

Harvest Mouse.—I pass on now to notice the Harvest Mouse. This little animal is the smallest British Mammal, and is exceedingly pretty and elegant; the colour of its fur is reddish brown on the back and white on the abdomen. The whole length of the animal is less than five inches, and the tail takes two-and-a-half of that. It feeds upon grain, and when very numerous creates great destruction. It also lives upon insects. Its tail is prehensile. It forms a pretty little nest upon a stalk of corn or grass, composed of dried grass, and about the size of a cricket ball. The nest has no aperture, but the

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materials of which it is composed are so loosely interwoven that it is easy for the animal to push its way through any part of the sides; and for the same reason the nest is very expansive, and probably is made at first much smaller than it ultimately becomes by the pressure and growth of the young mice deposited therein.

The foregoing animals just described belong to the genus Mus, but I now go on to notice two animals which have been placed by zoologists in another genus called Arvicola, and which are known by the name of Voles. There are two species, the water vole and the field vole. The water vole is very like the rat in general appearance, and is often mistaken for it. It is of a chestnut brown colour on the upper parts of the body, fading to gray below. The tail is shorter relatively to the body than in the rat; and the ears of the vole are very short indeed, and hardly visible. The incisor teeth are of a yellow hue, and are very thick and strong. The habitat of the water vole is always by the banks of ponds and streams; it is a first-rate swimmer and diver, and its food is aquatic plants, especially the mare's tail, or "Equisetum." It is not, like the rat, carnivorous. It makes tunnels in the banks of pools, and often causes mischief from making passages where the water can escape. It has considerable affinity to the beaver in habits. The field vole, or campagnol, or field mouse, is a little animal, allied to the water vole in structure, and about the size of a common mouse. It is of a ruddy brown colour, with very short ears, and a tail only one-third the length of the body. It lives on grain and seeds of various descriptions, is very prolific, and burrows in the soil. It is fond of water, and usually frequents moist ground. It is sometimes very destructive in nibbling the roots and bark of tender and newly planted trees and shrubs.

Hare.—Passing on now to the family of Leporidæ, we find in this country two species, the hare and the rabbit, both of which animals are so well known with respect to their external form, that it will be quite unnecessary to give a detailed account of their appearance. I may, however, mention that the distinctive peculiarity of the genus Lepus consists in their having, besides the two large and ordinary incisor teeth in the upper jaw, two smaller ones placed immediately behind them; it is not very clear what use these smaller teeth are to this family of Rodents. These animals are all swift of foot, and retreat very quickly when disturbed. The common hare, although its trivial scientific name is timidus, is said on occasions to display considerable courage. From the much greater length of the hind limbs than the fore in the hare, its gait is more a series of jumps than an even gallop. Hares and rabbits differ in their habits, the former never burrowing below ground like the latter. They are both prolific animals, the rabbit however by far the most so. They are easily tamed, and domestication has produced many varieties of the rabbit. There are several foreign species of the genus Lepus, and in Ireland a species or variety of hare is found called Lepus hibernicus. This is supposed to be the same animal as the Alpine hare. It is perhaps needless

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to remark that both hares and rabbits, when allowed to increase too much, become exceedingly destructive to the crops and tender herbage of all kinds.

DORMOUSE.—This little animal is about 5½ inches long, of which the tail is 2½. It is a native of this country and of Southern Europe; it is not a very common animal in most parts of England. The colour of its fur is light reddish brown on the back, yellowish white on the abdomen, and white on the throat. It lives in trees and shrubs, and builds a comfortable nest, in which it sleeps nearly all day and nearly all winter; its food is seeds, nuts, and beetles. The tail is thickly covered with hair, and the hind feet are prehensile. The fore limbs are capable of great rotary motion, and the clavicles are perfect; they differ from all other Rodents in possessing no cæcum. The fore feet have four toes and a wart for the thumb; they are clawless, the hind feet have five toes and small claws. These animals are interesting as examples of hibernation, which is a state of sound slumber in which they pass most of the winter. While in this condition all the vital functions of the body are much depressed, and respiration almost ceases. The animal always commences the hibernating season fat, which fat is gradually used up as fuel to maintain the temperature of the body, which, however, is much lower than at other times.

SQUIRREL.—I will now close these few remarks by a brief notice of the Squirrel. This pretty little rodent is of a chestnut brown colour, and possesses a very handsome bushy tail. Its head is somewhat round in form, and its jaws and teeth very strong; its food consists of nuts and seeds, and it is also said sometimes to indulge a carnivorous appetite and eat birds' eggs and even young birds. Its habitat is among the branches of trees, where it builds a most comfortable nest in the fork of two or more branches, and lives all the year round with its mate, hibernating in the winter. It displays amazing activity in leaping about from branch to branch, and its toes are gifted with sharp and strong claws. The squirrel breeds once a year, and produces three or four young at a litter. Like other hibernating animals, it gets very fat towards the close of autumn, and it lays up in various places a store of nuts, &c., for consumption during winter and spring, and occasionally wakes out of its slumber to refresh itself from these stores.

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THE REMARKABLE TREES

OF

HEREFORDSHIRE.

THE MONNINGTON OAK, 1870.

(Q. Pedunculata.)

This very fine old Oak stands in the Monnington Meadow, near the new stone bridge over the Wye to Moccas. The trunk stands up well, and gives at 5 feet from the ground, a good measurement of 31 feet in circumference. It still sends out much living spray on its northern and western sides. *(See Transactions for* 1870, *p.* 318.*)*

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APPENDIX OF ALTITUDES.

CORRECTED AND ADDITIONAL ALTITUDES SENT BY MR. ROBERTS, C.E.

		Height above sea-level in feet.
Hereford—Barr's Court Station	... ...	174
,, Barton	Ditto	176
Holme Lacy	Ditto	201
Fawley	Ditto	198
Ross	Ditto	128
Mitcheldean	Ditto	348
Longhope	Ditto	222
Grange Court	Ditto	55
Tram Inn	Ditto	288
St. Devereux	Ditto	281
Pontrilas	Ditto	265*
Pandy	Ditto	345
Llanfihangel	Ditto	472
Abergavenny	Ditto	236
Rhayader	Ditto	712
Dolau Chapel, near Nantmel	... ...	703
Nantmel School	... ...	687
Llanbadarn-fawr Church ...	... ...	622
Llandegle Church	... ...	809
RADNOR FOREST :—		
Summit on Road from New Radnor to Builth	... ...	1242
Ditto on Road from Ditto to Penybont	... ...	1275
"Castle Trot" Tumulus ...	... ...	1273
Forest Gate House	... ...	1146
Leynhilyn Pool	... ...	1212
Llanfihangel Nantmelan Church	... ...	987
New Radnor—Base of Sir Geo. Cornewall Lewis's Monument		... 752
Kington—Station platform ...	... ...	492
Lyonshall—On Turnpike by Old Tramway Crossing		 566
Titley—Station Platform ...	... ...	489
Presteign—On sill of entrance to County Goal	... ...	500·4

* In consequence of a clerical error, Pontrilas Station has been given formerly as 366 feet above sea-level.

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Kinsham—On Road north side of Brldge over River Lugg	413
Lingen Village	476
Berkeley Cross Turnpike Gate	567
Leintwardine Village near the Bridge	397
Hopton's Heath Station platform	469
Clunton Village	515
Clun near Hospital	583
Broom Station platform	454
Craven Arms Station platform	398
Pembridge Station	322

EDWIN J. ISBELL.

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THE WYE.

Register of Height of River in the year 1872, taken daily at Hereford Bridge at 9 a.m. The datum point is the summer level of the river.

1872.	No. of days wet or stormy.	No. of days dry.	Height of river above summer level.		Average height each day.		No. of days of low water.
			FEET.	INCHES.	FEET.	INCHES.	
January	29	2	128	9	4	1¾	0
February...	15	14	112	5	3	10½	0
March	14	17	87	5	2	9¾	0
April	16	14	75	4	2	6	0
May	22	9	60	8	1	7½	0
June	24	6	76	1	2	6	0
July	8	23	75	6	2	5	0
August	14	17	46	5	1	6	0
September	16	14	88	7	2	11¼	0
October	12	19	138	10	4	5¾	0
November	19	11	180	5	6	0	0
December ...	15	16	68	8	2	2½	0
Total, 1872	194	162	1139	1	37	0	0

OBSERVATIONS.	FEET.	INCHES.
Height of river on 5th...	10	6
,, ,, 17th...	9	6
,, ,, 1st...	11	2
,, ,, 29th...	11	4
,, ,, 2nd...	7	6
,, ,, 5th...	5	0
,, ,, 9th...	7	6
,, ,, 19th...	11	6
,, ,, 7th...	13	0
,, ,, 6th...	5	0
,, ,, 28th...	12	0
,, ,, 11th...	12	0
,, ,, 30th...	14	0
,, ,, 3rd...	14	0
,, ,, 24th...	13	9
,, ,, 9th...	10	0
,, ,, 17th...	12	0
,, ,, 29th...	11	0

The flood register gives the aggregate number of feet for the year at 1,139, by far the largest amount registered since these Tables have been kept. We must go back probably to 1860 for a similarly wet year. The character of the year, differs, however, from that of 1860, in that the floods of 1872 were accompanied by a high temperature 1860, is stated by Mr. Southall (Woolhope Transactions, 1870, p. 81), to have been "An exceptionally cold year with great deficiency of sunshine, and large excess of rain and cloudy weather." This description would not be accurate of 1872, as the temperature of the summer months was by no means low. These Tables were submitted to the Commissioners at their Inquiry at Ross, in December, 1874, and excited much interest. The Commissioners expressed the hope that in future years the temperature of the river might be taken daily. A very large run of salmon made up the river in the same floods, and in three consecutive days and nights at Fownhope the unprecedented number of 259 fish, averaging 12 lbs. each, were taken by the draft net.

JOHN LLOYD.

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THE REMARKABLE TREES

OF

HEREFORDSHIRE.

THE STAG'S HORN OAK.

MOCCAS PARK, 1873.

A tree that has met with difficulties and troubles in its life, as shown, not only by the death of its leading branches, but also by the tremendous effort its vitality has made in throwing out so large an excrescence all round the trunk. It stands on low ground on the north side of the pool.

Sketched for "Gardener's Chronicle," by Worthington G. Smith, Esq., F.L.S.

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THE WYE.

Register of Height of River in the year 1873, taken daily at Hereford Bridge at 9 a.m. The datum point is the summer level of the river.

1873.	No. of days wet or stormy.	No. of days dry.	Height of river above summer level.		Average height each day.		No. of days of low water.	OBSERVATIONS.		
			FEET.	INCHES.	FEET.	INCHES.			FEET.	INCHES.
January	21	10	169	9	5	5½	0	Height of river on 9th...	11	0
February	5	23	39	3	1	4¾	0	,, ,, 26th...	6	6
March	10	21	80	8	2	7	0	,, ,, 7th...	7	0
April	12	18	35	11	1	2¼	0	,, ,, 17th...	4	0
May	10	21	30	6	0	11⅜	0	,, ,, 6th...	3	0
June	6	24	3	6	0	1¼	22	Very dry.	0	0
July	6	25	28	2	0	10	0	Height of river on 4th...	3	9
August	9	22	45	4	1	5½	0	,, ,, 30th...	7	6
September	5	25	77	1	2	6¾	0	,, ,, 8th...	6	0
October	9	22	86	4	2	9½	0	,, ,, 12th...	9	0
November	10	20	82	10	2	9	0	,, ,, 9th...	5	3
December	3	28	49	8	1	7¼	0	,, ,, 1st...	3	6
								,, ,, 31st...	3	6
Total, 1873	106	259	729	0	23	8½	22			

There is scarcely anything remarkable to notice in this year except that in the small freshes of July and the floods of August a very large number of grilse or botchers came up the river. Since 1866, from some inscrutable cause, there had been a great scarcity of botchers, but this year the run was very large, and kept on continuously through the months of July and August. It was also noticed that the average size of these fish was larger than usual. 1873 will be remembered as a "a good botcher year."

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WOOLHOPE NATURALISTS' FIELD CLUB.

STATEMENT OF ACCOUNTS FOR THE YEAR ENDING DECEMBER 31, 1872.

Dr.	£	s.	d.
To Subscriptions received for 1872	34	10	0
,, Entrance Fees from seven new members	3	10	0
,, Arrears of Subscriptions received for 1871	8	0	0
,, ,, Entrance Fees ,, 1871	2	0	0
,, ,, Subscriptions ,, 1870	2	0	0
,, ,, Entrance Fee ,, 1870		10	0
,, ,, Subscriptions ,, 1869	1	0	0
,, Balance due to Treasurer	9	7	2
	£60	17	2

Cr.	£	s.	d.
By Balance due to Treasurer as per last account	26	3	5
,, Transactions for 1871 (Hereford Times)	10	10	6
,, Circulars, Stationery, Stamps, &c. ..	7	18	3
,, Printing the Flora (Phillips)	8	15	0
,, Assistant Secretary's Salary	5	0	0
,, Assistant Secretary (Postage Stamps) ..	2	10	0
	£60	17	2

Examined and found correct,

ELMES Y. STEELE, PRESIDENT.
ARTHUR THOMPSON, TREASURER.

HEREFORD, *February 20th*, 1873.

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WOOLHOPE NATURALISTS' FIELD CLUB.

STATEMENT OF ACCOUNTS FOR THE YEAR ENDING DECEMBER 31, 1873.

Dr.	£	s.	d.
To Subscriptions received for 1873	40	10	0
,, Entrance Fees from six new members ..	3	0	0
,, Arrears of Subscriptions received for 1872	29	10	0
,, ,, Entrance Fees ,, 1872	1	0	0
,, ,, Subscriptions ,, 1871	5	10	0
,, ,, Entrance Fee ,, 1871		10	0
,, ,, Subscriptions ,, 1870	2	10	0
,, Cash received for Illustrations	5	9	3
,, ,, ,, spare copy of Transactions		10	0
	£88	9	3

Cr.	£	s.	d.
By Balance due to Treasurer as per last account	9	7	3
,, Circulars, Stationery, &c	5	8	0
,, Assistant Secretary's Salary	5	0	0
,, Assistant Secretary (Postage Stamps)	3	3	0
,, Balance in Treasurer's hands	65	11	1
	£88	9	3

Examined and found correct,

JAMES DAVIES, M.A., PRESIDENT.
ARTHUR THOMPSON, TREASURER.

HEREFORD, *March 2nd*, 1874.

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Treasurer and Assistant Secretary:

Mr. Arthur Thompson, St. Nicholas-street, Hereford.

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FIELD MEETINGS APPOINTED

1874.

FRIDAY, MAY 15TH .....Church Stretton.

FRIDAY, JUNE 19TH .....Builth.

FRIDAY, JULY 17TH.....(Ladies' Day) Ross and Doward Caves.

TUESDAY, AUGUST 18TH.....Lydney.

THURSDAY, SEPTEMBER 24TH ..." A Foray amongst the Funguses."

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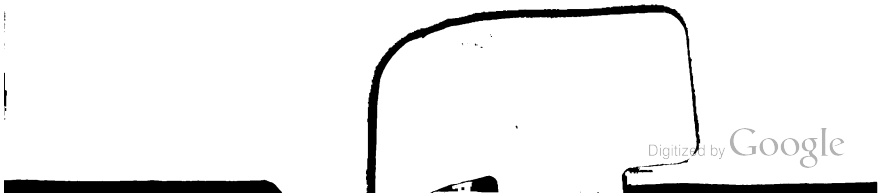

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